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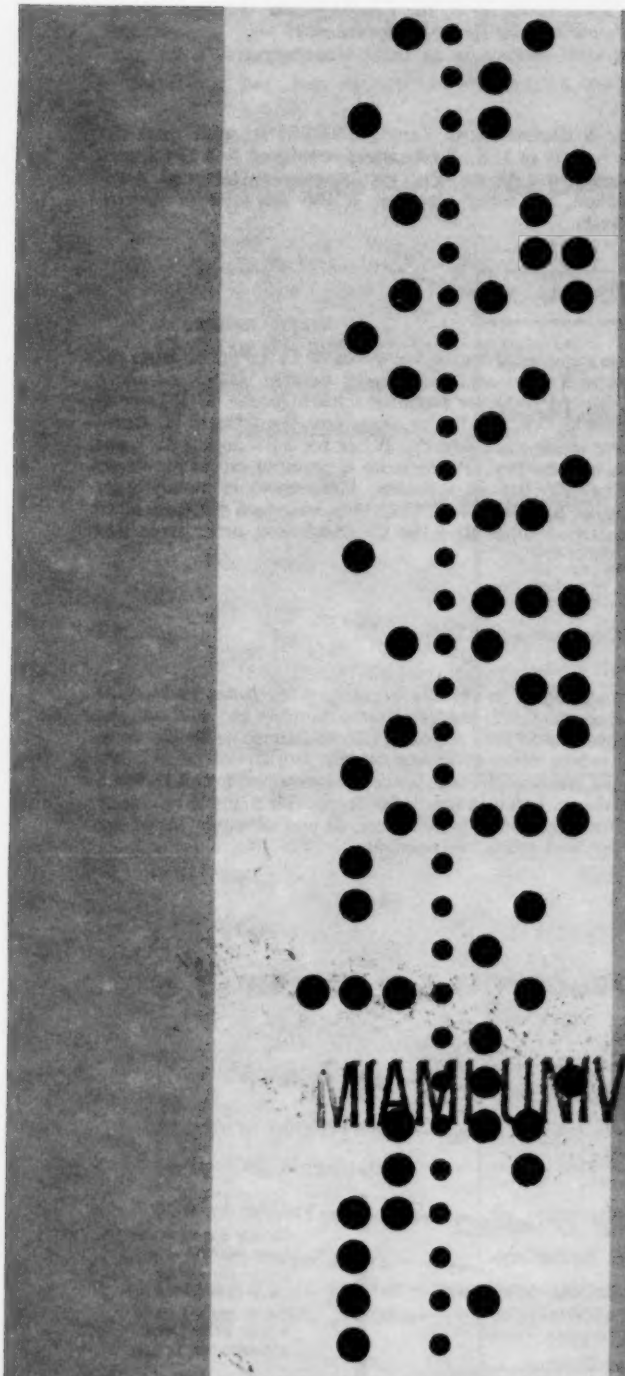
U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS

September 25, 1966



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Semi-Monthly Journal

- *Abstracts of R & D Reports*
- *List of Current R & D Projects*

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September 25, 1966 / Volume 41, Number 18

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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PURPOSE

U.S. Government Research & Development Reports (USGRDR) announces the availability of selected new reports of U.S. Government-sponsored R & D released by the Department of Defense, the Atomic Energy Commission, National Aeronautics & Space Administration, and other agencies. It also lists current Government-sponsored R & D projects.

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INDEX

All entries in USGRDR are indexed in the *Government-Wide Index to Federal Research & Development Reports (GWI)* published semi-monthly and sold on subscription by the Clearinghouse at $22.00 a year ($27.50 foreign). Single copy $1.75. Indexing data from recent issues of announcement journals of the Atomic Energy Commission, National Aeronautics and Space Administration, and Defense Documentation Center are also included in this index to provide a single reference guide to new unclassified Government-sponsored research and development in the physical sciences, engineering, and related technology.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

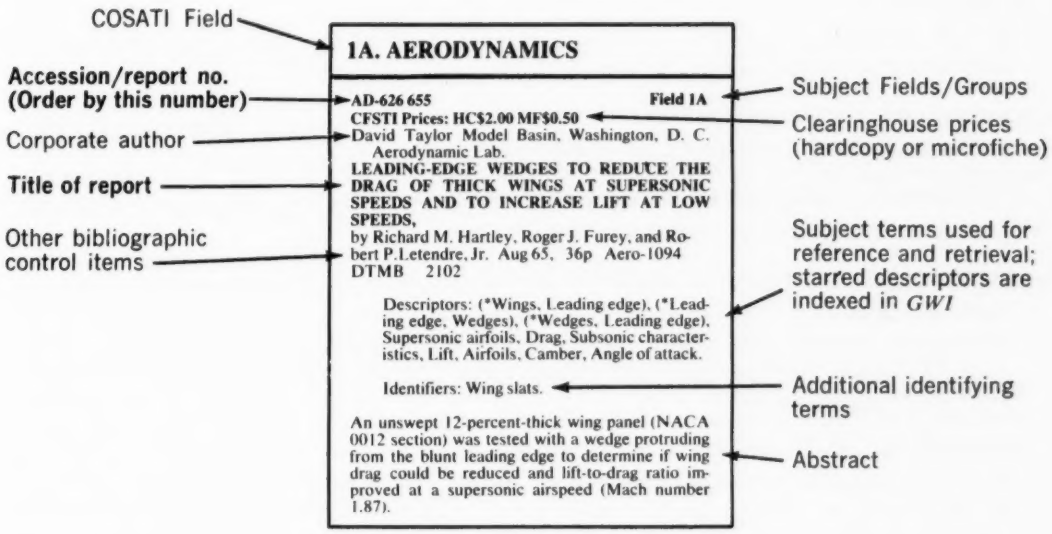
CLEARINGHOUSE FOR FEDERAL SCIENTIFIC
AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated. Use of funds for this publication approved by the Director of the Bureau of Budget, June 22, 1966.

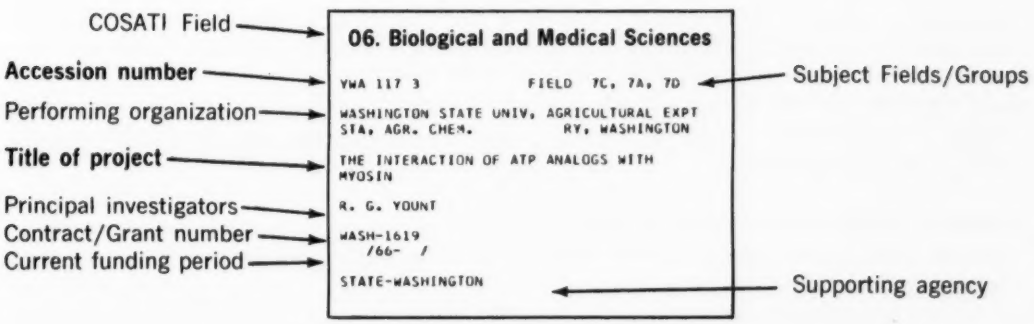
USGRDR FORMAT

Entries are arranged under 22 subject categories called FIELDS. In the entry, subcategories called GROUPS and occasionally sub-groupings are also indicated. This system was adopted by the Committee on Scientific and Technical Information (COSATI) of the Federal Council on Science and Technology. The COSATI Subject Category List, AD 612 200, is available from the Clearinghouse at $1.00. Documents are listed alphanumerically (that is, alphabetic data precedes numerical data) by accession/report number. Key segments of information contained in the entries are identified diagrammatically below.

● RESEARCH & DEVELOPMENT REPORTS


COSATI Field
1A. AERODYNAMICS
Accession/report no. (Order by this number)
AD-626 655
Field 1A
Subject Fields/Groups
CFSTI Prices: HC$2.00 MF$0.50
Clearinghouse prices (hardcopy or microfiche)
Corporate author
David Taylor Model Basin, Washington, D. C. Aerodynamic Lab.
Title of report
LEADING-EDGE WEDGES TO REDUCE THE DRAG OF THICK WINGS AT SUPERSONIC SPEEDS AND TO INCREASE LIFT AT LOW SPEEDS,
by Richard M. Hartley, Roger J. Furey, and Robert P.Letendre, Jr. Aug 65, 36p Aero-1094 DTMB 2102
Other bibliographic control items
Descriptors: (*Wings, Leading edge), (*Leading edge, Wedges), (*Wedges, Leading edge), Supersonic airfoils, Drag, Subsonic characteristics, Lift, Airfoils, Camber, Angle of attack.
Subject terms used for reference and retrieval; starred descriptors are indexed in GWI
Identifiers: Wing slats.
Additional identifying terms
An unswept 12-percent-thick wing panel (NACA 0012 section) was tested with a wedge protruding from the blunt leading edge to determine if wing drag could be reduced and lift-to-drag ratio improved at a supersonic airspeed (Mach number 1.87).
Abstract

● CURRENT R & D PROJECTS



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Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE 3

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS 4

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES 6

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 11

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 23

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY 50

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY 63

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Includes conversion techniques; power sources; and energy storage.

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11	MATERIALS Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.	113
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RESEARCH highlights

Reports of current high industrial interest

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Biological and Medical Sciences

BIOSENSOR MECHANISMS REVIEWED

(Order Stock No. N66-21094 Summary Report on a Review of Biological Mechanisms for Application to Instrument Design, HC $4.00/MF 75 cents.)

This study made by Allied Research Associates for the Space Agency is concerned with the function, structure and operational principles of biosensor mechanisms used on man and animals. It discusses the integrated role of the sensor in a total regulatory control loop, engineering analyses of sensor operation, and the evaluation of this data in terms of present and anticipated instrumentation requirements for a variety of uses. The instrumentation conceived may have application in areas ranging from hydrospace to interplanetary space.

HEAT EXCHANGER COOLS BLOOD FLOWING TO BRAIN

(Order Stock No. PB-170 712 A Biological Heat Exchanger for Brain Cooling, HC $1.00/MF 50 cents.)

A heat exchanger for cooling the brain has been used successfully by Canadian surgeons for over two years in operations on dogs and sheep. Developed in Ottawa by the National Research Council of Canada, the novel instrument uses ice water as the coolant to lower the temperature of blood flowing through the carotid artery to the brain to as low as 41°F. The Canadian development program was undertaken because neurosurgery is limited by failure of the brain to withstand any extended period without a blood supply. Fortunately, the metabolic rate of brain tissue is proportional to its temperature, and the higher nervous system can withstand much lower temperatures than the heart.

Two methods of connecting the heat exchanger to the arterial circuit have been used in over 100 operations investigating the various problems involved in both the medical and engineering fields. It is connected to the arterial system by flexible medical grade polyvinyl chloride tubings that terminate at the artery end with special metal adaptor tubes, or cannulae. Initially, the common carotid artery was transected and the cannulae connected to the severed ends to complete the circuit. Later a shunt was used, with blood being supplied from the left femoral artery in the groin to one heat exchanger and then flowing through the exchanger to the left carotid artery. A cannula attached to the right carotid artery returned the blood to a second exchanger, thence to a cannula attached to the right femoral artery. A radio frequency induction heating blanket was used to maintain the temperature of the torso.

Results show that selective profound brain cooling can be attained while maintaining a safe heart temperature. Both hemispheres of the brain were cooled, and at an elapsed time of 64 minutes the brain temperature was 42.8°F while the esophageal temperature was 86°F. At the 74-minute mark the blood flow to the brain was stopped and rewarming of the brain without circulation was allowed for a 1-hour period. In 63 minutes the brain rewarmed approximately 35.6°F. The animal made an uneventful recovery and 24 hours later appeared to be quite normal.

Metalworking and Metal Forming

BATTELLE REVIEWS PRACTICES FOR JOINING NICKEL

(Order Stock No. NASA TM X-53447 Joining of Nickel and Nickel-Base Alloys, HC $5.00/MF $1.00.)

Practices for joining nickel and nickel-base alloys that contain at least 50 percent nickel are reviewed in a state-of-the-art report prepared by Battelle Memorial Institute. The report gives the latest information on joining prepara-

tions, processes, and joint quality in brazing, welding, and soldering. The technological know-how was obtained from equipment manufacturers, nickel producers, technical publications, reports from Government contracts, and from interviews with engineers employed by major fabricators of nickel-base alloys. Data from reports and memoranda issued by the Defense Metals Information Center also are used, along with information obtained from the Redstone Scientific Information Center and the Defense Documentation Center. A DMIC report covered the literature to 1962 and Battelle's search covers it to the report date of April 1966.

METHODS FOR SHAPING NICKEL EXAMINED

(Order Stock No. NASA TM X-53430 The Making of Nickel and Nickel-Alloy Shapes by Casting, Powder Metallurgy, Electroforming, Chemical Vapor Deposition, and Metal Spraying, HC $6.00/MF $1.25.)

Battelle has published a state-of-the-art report that covers the making of nickel and nickel-alloy shapes by casting, powder metallurgy, electroforming, chemical vapor deposition, and metal spraying. Of these methods, casting and electroforming are the most extensively used for making final shapes. Powder metallurgy methods are being used to make pure nickel strip for special applications, while special alloys such as nickel dispersion strengthened with thorium oxide, Monel, and others are made from powders in the forms of strip and extrusions. Battelle indicates that the recently increased availability of prealloyed powders may result in more use of this versatile process. Information contained in this review came from a wide variety of sources as set forth in the preceding report. As a single-volume reference work it can be of value to the military, and to those in the aerospace field.

FASTENING OF TITANIUM MATERIALS

(Order Stock No. NASA TM X-53442 Mechanical Fastening of Titanium and Its Alloys, HC $3.00/MF 75 cents.)

A Battelle state-of-the-art report on the mechanical fastening of titanium and its alloys is primarily intended for the use of design and manufacturing engineers who have previous experience in mechanically fastening steel and aluminum. When the fastening of titanium materials is demonstrably different from the fastening of common materials, Battelle notes the differences. Where no known differences exist, the report does not repeat at length the information or procedures that are readily available or widely known. In addition to the sources noted above, literature searches extended to the Fasteners Research Council Technical Abstracts to 1958. A review was also made of trade information available from titanium-fastener manufacturers.

FLEXIBLE CASTING TECHNIQUES DESCRIBED

(Order Stock No. NASA SP-5044 Selected Casting Techniques, HC $1.00/MF 50 cents.)

Accurate castings of complex, thin, or odd-shaped configuration can be quickly and easily obtained in limited quantities by using the procedures set forth in a Space Agency publication. The procedures involve the adaptation and incorporation of readily available materials, and the modification of regular patternmaking and foundry practices. The various steps and techniques are not inflexible, but may be modified as required or desired. Also, the use of uncommon tools, intricate jigs, or other special fabrication devices is not required. Although the casting procedures were developed for the expeditious production of wind-tunnel models, the Space Agency says that does not prevent their application or adaptation, either in whole or in part, to other projects by industry.

HIGH DENSITY COMPACTION FOR FABRICATING DISPERSION ALLOYS

(Order Stock No. NASA TN D-3511 Cold Consolidation of Metal Plus Dispersoid Blends for Examination by Electron Microscopy, HC $2.00/MF 50 cents.)

NASA's Lewis Research Center suggests that high-energy-rate compaction methods may find application in the fabrication of dispersion alloys on a billet-size scale. Since compaction to high densities may be achieved while retaining a distribution of the fine dispersoid, this method might be used in place of conventional pressing and sintering. High-energy-rate methods might also be of benefit in making dispersion materials having alloy matrices made from elemental powders. Cartridge-Actuated Compaction Press (CACP) as a laboratory tool may also prove useful as an aid in obtaining accurate chemical analyses of oxygen on fine metal powders. Electron microscopy showed that particles as fine as 0.01 micron were discernible in the microstructures, a particle size within the range considered desirable for dispersion strengthening.

Physics

TWO-MILE LONG ACCELERATOR COMPLETED AT STANFORD

(Order Stock No. SLAC-62 The Story of Stanford's Two-Mile Long Accelerator, HC $4.00/MF 75 cents.)

One of the latest and most esoteric of a continually growing family of gigantic devices to serve the needs of the relatively new science called High Energy Physics has been completed at the Stanford Linear Accelerator Center in California. The story of the development of this scientific probe has now been published by Stanford. Occupying 480 acres, the 20 billion electron volt linear accelerator extends for two miles and cost $114 million to design and build. Operations are expected to begin before the end of 1966.

The details of the story behind this exciting scientific tool have until now existed only in bits and pieces: in specialized professional journals, government reports, internal memoranda, laboratory notebooks, consultants' findings, and, in some areas, only in the memories of members of the staff. Stanford's story is in nontechnical language. The publication relates the background of the development of machines for high energy physics, the appearance and evolvement of traveling wave electron linear accelerators, the design and engineering of the machine, the construction of the facility with particular attention to geological considerations, calculations and planning for radiation containment, and the use of the machine in elementary particle physics research.

Semiconductors and Related Materials

SEMICONDUCTOR BIBLIOGRAPHY PUBLISHED

(Order Stock No. SB-435, Suppl. 1, Semiconductors, HC only, $1.00.)

A selective bibliography compiled by the Clearinghouse lists 1,334 domestic and foreign references added to the CFSTI collection during the period of October 1960 through April 1966. The reports are listed by the following categories: Organic, High Temperature, Radiation Damage, Surface Effects, Thin Film, Solid State Devices, Devices and Applications, Thermoelectric Materials, Materials and Properties, Translations, and Patents.

DEVICE ACCURATELY BONDS DICE TO HEADERS

(Order Stock No. AD-634 030 Semiconductor Wafer-Bonder, HC $1.00/MF 50 cents.)

Semiconductor devices can be accurately and reproducibly bonded to a variety of commercial headers with a wafer-bonder assembly developed by the Army's Harry Diamond Laboratories. According to HDL, the bonder has proved to be invaluable in the mounting of devices in the laboratory. Dice as small as 0.030 in. square and as large as 0.070 by 1.100 in. have been successfully bonded to commercial headers. Except in isolated cases the operation has been carried out so that no harmful effects to the devices could be noted. HDL notes that in the course of fabricating semiconductor devices, it is necessary, after completion of the device, to bond the die to a header substrate. The wafer-bonder assembly accomplishes the following necessary steps: (1) Holds the header securely; (2) Places a small, low melting-point preform on the header; (3) Places the semiconductor die on top of the preform; (4) Applies pressure to the top of the die; (5) Introduces a nonoxidizing atmosphere; and (6) Applies heat to the header. The HDL report describes the design and operation of the assembly and contains close-up photographs.

Space Technology

MOON PHOTOGRAPHER SURVEYOR I SUBJECT OF NASA PAMPHLET

(Order Stock No. NASA SP-126 Surveyor I, A Preliminary Report, HC only, 75 cents.)

The National Aeronautics and Space Administration has published its initial report on the picture-taking Surveyor I spacecraft that soft-landed on the Moon on June 2 and sent back to Earth over 10,000 photographs of high scientific content before the lunar night ended its mission. The Space Agency compiled the publication in the interest of quickly reporting the scientific interpretations made during the first days of the mission. It is preliminary in nature and does not attempt to present detailed measurement and analysis of the immense amounts of scientific data that Surveyor I telemetered to Earth. This task will take months and even years. It does describe in nonscientific terms the 300,000-lb. Atlas-Centaur launch vehicle, the spacecraft itself which weighed 2194 pounds at launch and 596 pounds on landing, the survey TV camera that responded to commands from Earth and scanned different parts of the Moon in sending back its pictures, how the Earth-Moon trajectory and soft landing were achieved, and the preliminary scientific results learned about the lunar surface and its terrain.

FOREIGN SCIENCE BULLETIN AVAILABLE ON SUBSCRIPTION

Foreign Science Bulletin, a monthly review of selected foreign literature relating to aerospace research and development, can now be ordered on a subscription basis from the Clearinghouse. Prepared by the Aerospace Technology Division of the Library of Congress, the serial publication features the most significant articles from the open literature of the Soviet Union, Soviet bloc countries, and Communist China. The articles are carefully screened for their scientific or technical merit.

Basically, the most recent literature is reviewed by specialists in the aerospace field, but articles from other disciplines which can relate to aerospace science and technology are also included. For instance, a recent issue featured a Soviet article on a nonresonant feedback laser with two ruby rods as the active medium and the external mirrors replaced by a surface scatterer. Another concerns growth of silicon carbide single crystals and epitaxial thin films for use in high-temperature electronic devices. Another deals with polymerization of monomers.

A limited number of the September issue of Foreign Science Bulletin will be supplied free to those who wish to review the publication before subscribing. Also, a limited supply of back issues may be purchased at $3.00 per copy.

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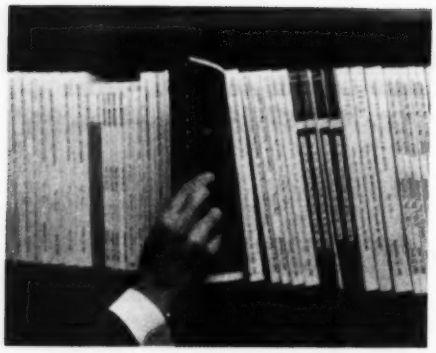
Transportation (Land, Sea, Air, Space)

NEW COST ESTIMATES FOR OPERATING JET AIRCRAFT

(Order Stock No. PB-170 691 Operating Cost Estimates for Long-Haul Subsonic Jet Aircraft, HC $3.00/MF 75 cents.)

Equations have been developed by Planning Research Corporation to estimate the cost of operating long-range, four-engine jet aircraft over long route segments. The costs apply to subsonic aircraft presently in service, such as the Boeing 707 and the Douglas DC-8. The equations are for a typical flight distance of 1455 miles domestically and 1980 miles internationally. For estimating direct operating costs -- those associated with the physical operation of the aircraft -- the cost methodologies of the Air Transport Association formula have been used. The other costs follow the Civil Aeronautics Board accounting system and are affected more by the traffic carried than by the operation of the aircraft. Many of these indirect costs are determined by managerial policy or the degree of competition: for example, advertising and sales expenses, or the cost of food and beverages.



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TECHNICAL TRANSLATIONS—semimonthly foreign technical literature announcement journal listing Government and private sources. Annual subscription $12, add $4 for foreign mailing, single copy 60 cents. Order from Superintendent of Documents, U. S. Government Printing Office.

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SB-541 Fluid Amplifiers
SB-543 Numerical Control Tool Systems
SB-544 Life Testing of Materials
SB-546 Space Environmental Conditions (Materials)
SB-547 Cryogenics

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OTR-128 Plastic coatings
OTR-129 Brazing Technology and Application
OTR-132 High Temperature Adhesives above 500°F
OTR-139 Flexible, Transparent Packaging Materials

RESEARCH & DEVELOPMENT REPORTS

1. AERONAUTICS

AD-451 781 **Field 1, 16A, 4B**
CFSTI Price: HC$3.00
Inter-Range Instrumentation Group, White Sands Missile Range, N. Mex.
WHITE SANDS MISSILE RANGE REFERENCE ATMOSPHERE. PART I.
28 Jun 64, 86p IRIG-104-63

Descriptors: (*Meteorology, Guided missile ranges), (*Guided missile ranges, Meteorology), (*Atmosphere models, Guided missile ranges), High altitude, Density, Wind, Pressure, Temperature, Humidity, Tables, Atmosphere models, Atmospheric temperature, Height finding, Moisture, Sound transmission, Velocity, Vapor pressure, Radiosondes.

The IRIG Range Reference Atmosphere, which is presented in this document, is the second in a series to be published by the Inter-Range Instrumentation Group/Meteorological Working Group. Part I contains an explanation of the basic data, computational procedures, and the resulting values tabulated for altitude intervals between mean sea level and 30 km altitude. Monthly and annual thermodynamic values and wind quantities are tabulated in Part I. The thermodynamic quantities are height (gpm), pressure (kg f/sq m), pressure (mb), temperature (K), virtual temperature (K), density (g/cu m), speed of sound (m/sec), relative humidity (%), and vapor pressure (mb) tabulated at 250 m intervals of geometric altitude. The wind quantities are scalar wind, zonal and meridional component values (m/sec) for eleven cumulative percentage frequency levels tabulated at 1 km intervals from 0 to 27 or 30 km altitude. A separate document for Part I will be issued for each of the several IRIG Range Reference Atmospheres. Part II will extend the tabulations of Part I for seasonal and annual periods to 50 km altitude and for summer and winter periods to 90 km altitude. Not all parameters can be presented in as much detail for the 30 to 90 km altitude region as for the 0 to 30 km interval. Part III will contain information on the variability of the principal atmospheric parameters from 0 to 90 km altitude. (Author)

1A. AERODYNAMICS

AD-463 927 **Field 1A**
CFSTI Price: HC$5.60
Ballistic Research Labs., Aberdeen Proving Ground, Md.
SHOCK PRESSURE INCREASE IN CONVERGENT DUCTS.
Memo. rept.
by George A. Coulter. Jan 65, 51p BRL-MR-1625
Proj. DA-1P014501A33E

Descriptors: (*Shock tubes, Ducts), (*Shock waves, Shock tubes), Aerodynamic configurations, Pressure, Wind tunnel nozzles, Piezoelectric gages, Experimental data, Analysis, Supersonic flow, Reflection.

Pressure-time histories obtained from piezo-electric transducers are shown for shock waves inside various shaped convergent ducts. The convergent ducts used ranged from an area ratio of 22 for the discontinuous area change to 8149 for a conical duct with an included angle of 15 degrees. The step input shock pressure ratio was varied from 1.6 to about 28. A maximum peak reflected shock pressure of over 11,000 psi was recorded for the large conical area change. The results are presented in both tabular and graphical form for the various ducts used. These results show that the corresponding increase in peak pressure is found to vary both with the shape of the convergent duct and with the area change ratio. (Author)

AD-636 392 **Field 1A, 14B, 20D**
CFSTI Prices: HC$10.10 MF$3.00
Air Force Flight Test Center, Edwards AFB, Calif.
FLIGHT TEST ENGINEERING HANDBOOK.
Technical rept. for Jun 64-Jan 66.
by Russel M. Herrington, Paul E. Shoemacher, Eugene P. Bartlett, and Everett W. Dunlap. Jan 66, 710p TR-6273-Rev.
Corrected and revised edition, Jun 64-Jan 66.

Descriptors: (*Flight testing, Handbooks), (*Aeronautics, Flight testing), (*Aerodynamics, Flight testing), Engineering, Aircraft, Performance (Engineering), Test methods.

Methods of obtaining flight test data for reciprocating engine aircraft (including helicopters) and turbojet aircraft are presented together with various methods of data analysis and data presentation. Correction of aircraft performance to standard conditions is included, as are detailed derivations of correction factors and performance parameters. Numerous graphs and charts containing information required by and useful to the flight test engineer are presented, together with sample data reduction forms and sample flight test programs. (Author)

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by Michael P. Scully. Dec 65, 52p TR-123-2
Contract NOw-64-0188-d

Descriptors: (*Helicopters, *Aerodynamic loading), Harmonic analysis, Approximation (Mathematics), Wake, Helicopter rotors, Vortices.

Assuming a constant circulation, rigid, trailing wake and using a lift deficiency function to represent the unsteady aerodynamic effects, various methods of calculating the airloads on a helicopter rotor in steady, forward flight were developed for the purpose of achieving: (a) faster solution times for a given level of accuracy and (b) a more accurate representation of the lifting surface/vortex interaction for the case where the blade passes close to the vortex line generated by a previous blade. Since most of the solution time is required to calculate the induced velocities due to the trailing wake, various approximate methods of calculating the induced velocities due to a rigid, skewed helix were developed. (Author)

AD-637 054 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
USSR - BIRTHPLACE OF AERODYNAMICS.
by N. S. Arzhanikov, and V. N. Maltsev. 9 May 66, 36p FTD-MT-65-497
TT-66-62031
Edited machine trans. of mono. Aerodinamika, Moscow, p1-17, 470-3 1952.

Descriptors: (*Aerodynamics, USSR), Scientific personnel, Bibliographies.

Contents: development hydroaerodynamics in XVIII and XIX centuries in Russia; N. Ye. Zhukovskiy and S. A. Chaplygin - founders of contemporary aerodynamics; leading role of soviet scientists in development of aerodynamics.

N66-10695 **Field 1A**
CFSTI Prices: HC$1.00 MF$0.50
British Aircraft Ltd., London (England).
THE FLOW OF TURBULENT INCOMPRESSIBLE TWO-DIMENSIONAL JETS OVER VENTILATED CAVITIES.
Paper B3.
by J. R. C. Pedersen. 1965, 12p
Prepared for presentation at Intern. Conf. on Fluid Logic and Amplification (1st.), 8-9 Sep 65.

Descriptors: *Incompressible flow, *Cavity, *Turbulent jet, *Two-dimensional jet.

For abstract, see T 66 18.

N66-11855 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.50
Aeronautical Research Council, London (England).
MEASUREMENTS OF DYNAMIC STABILITY FROM THREE SIMPLIFIED FREE-FLIGHT MODELS OF A SUPERSONIC RESEARCH AIRCRAFT (BRISTOL T 188) OVER THE MACH NUMBER RANGE 1.2 - 2.6.
by K. J. Turner. 1965, 56p ARC-CP-816, ARC-23295
RAE-AERO-2648

Descriptors: *Free flight, *Aerodynamic characteristics, *Dynamic stability, *Supersonic aircraft.

N66-11856 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Aeronautical Research Council, London (England).
MEASUREMENTS OF PRESSURE FLUCTUATIONS ON THE SURFACE OF A DELTA WING.
by V. Krishnamoorthy. 1965, 32p ARC-CP-767, ARC-25640
AASU-246

Descriptors: *Delta wing, *Surface pressure, *Aerodynamic characteristics.

N66-14375 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Von Karman Inst. for Fluid Dynamics, Rhode Saint-Genese (Belgium).
EFFECT OF MACH NUMBER ON STREAMWISE VORTICES IN LAMINAR REATTACHING FLOWS.
by J. J. Ginoux. Jul 65, 35p VKI-TN-26
Grant AF-EOAR-65-11

Descriptors: *Vortex, *Hypersonic wind tunnel, *Laminar flow, *Mach number, *Supersonic wind tunnel.

N66-15574 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautical Lab., Bangalore (India).
INVESTIGATIONS ON VORTEX FLOWS.
by Y. V. G. Acharya, P. A. Irani, and K. Krishnamurthy. Sep 65, 59p TN-AE-28-65

Descriptors: *Helical flow, *Vertical motion, *Vortex flow, *Rotational flow, *Vortex tube.

N66-15583 **Field 1A**
CFSTI Prices: HC$9.64 MF$3.25
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
NACA CONFERENCE ON AERODYNAMICS OF HIGHSPEED AIRCRAFT. A COMPILATION OF THE PAPERS PRESENTED.
1953, 664p NASA-TM-X-57121

Descriptors: *Aerodynamics, *Conference, *High speed flying.

N66-15731 **Field 1A**
CFSTI Prices: HC$4.00 MF$0.75
Nortronics, Newbury Park, Calif. Applied Research Dept.
CALCULATION OF TWO-DIMENSIONAL TURBULENT FLOW FIELDS.
by W. E. Carr, W. J. Niles, R. L. Rentfrow, and J. G. Trulio. Aug 65, 108p NARD-15-R
Contract NAS8-11400
NASA-CR-69539

Descriptors: *Circular cylinder, *Compressible flow, *Viscous fluid, *Navier-strokes equation.

N66-15796 Field 1A
CFSTI Prices: HC$3.00 MF$0.75
National Aero- and Astronautical Research Inst., Amsterdam (Netherlands).
OPTIMUM SHAPE OF A BODY OF REVOLUTION WITH BASE DRAG AT SUPERSONIC SPEED.
by J. Raat, F. Van Der Walle, and P. J. Zandbergen. 16 Sep 64, 66p NLR-TN-G.22

Descriptors: *Aerodynamics, *Drag, *Body of revolution, *Supersonic speed.

N66-16431 Field 1A
CFSTI Prices: HC$1.00 MF$0.50
National Aero- and Astronautical Research Inst., Amsterdam (Netherlands).
THE BEHAVIOR OF THE WAVE DRAG COEFFICIENT OF A CERTAIN OPTIMUM BODY IN OFF-DESIGN CONDITIONS.
by H. I. Baurdoux, and P. J. Zandbergen. 8 Oct 64, 25p NLR-TN G.33

Descriptors: *Nose cone, *Supersonic wind tunnel, *Wave drag, *Optimization.

N66-16984 Field 1A
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co., Sunnyvale, Calif.
STAGNATION POINT FLOW WITH RADIATION.
by R. F. Chisnell, H. Hoshizaki, and L. E. Lasher, Oct 65, 44p LMSC-4-43-65-4
Contract NAS7-295
NASA-CR-70171

Descriptors: *Hypersonic flow, *Inviscid flow, *Stagnation region, *Radiative heat transfer, *Viscous flow.

N66-17265 Field 1A
CFSTI Prices: HC$4.00 MF$1.00
Thiokol Chemical Corp., Ogden, Utah. Astro-Met Div.
A DIGITAL COMPUTER SIMULATION OF HIGH -ALTITUDE PARACHUTE RESPONSE TO WIND GRADIENTS.
by R. L. Ammons. 23 Jun 65, 146p
Contract NAS1-4537
NASA-CR-66045

Descriptors: *Computer simulation, *Wind shear, *Parachute.

N66-18459 Field 1A
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EFFECTS OF MODEL GEOMETRIC ACCURACY ON COMPARISON OF WIND-TUNNEL AND FLIGHT PRESSURE MEASUREMENTS ON A LAUNCH VEHICLE.
by G. C. Greene, T. C. Kelly, and R. J. Keynton. Mar 66, 28p NASA-TN-D-3274

Descriptors: *Ram B launch vehicle, *Wind tunnel stability test, *Flight test vehicle.

N66-18460 Field 1A
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
MASS-FLOW RATES AND TOTAL-PRESSURE RECOVERIES FOR A SEMICIRCULAR OPEN-NOSE INLET AT MACH 6.
by L. R. Boney, and J. S. Dennard. Mar 66, 83p
NASA-TN-D-3277

Descriptors: *Air breathing engine, *Mass flow rate, *Pressure recovery.

AD-636 750 See Field 20D

AD-636 751 See Field 20D

1B. AERONAUTICS

AD-636 433 Field 1B, 5J
CFSTI Prices: HC$4.00 MF$1.00
Dunlap and Associates, Inc., Santa Monica, Calif. Western Div.
MEASURES OF PILOT PERFORMANCE: COMPARATIVE ANALYSIS OF DAY AND NIGHT CARRIER RECOVERIES.
Final rept.
by Clyde A. Brictson. Jun 66, 149p
Contract Nonr-4984 (00)

Descriptors: (*Pilots, Performance (Human)), (*Aviation accidents, Carrier landings), (*Carrier landings, Performance tests), Night flight, Approach, Landing aids, Visibility, Illumination, Visual perception, Space perception, Altitude, Errors, Mathematical analysis, Psychophysiology.

The research purpose was to explore the psychophysical differences implied by a day/night carrier landing accident ratio of 1:4. The approach required a valid and reliable in-flight measure of pilot landing performance to (a) determine quantitative differences between day and night landings, and (b) differentiate the influence of day and night visual information performance. An attempt to quantify and define day/night pilot landing performance was the subject of a field experiment in which landing performance was recorded for 21 Navy F4 pilots during day and night carrier landing operations. Altitude and lateral error were the principal measures of pilot performance. Results: Generally, pilots tended to approach slower and higher, and land harder and shorter by day than by night. Significant differences were found between day and night pilot altitude performance at 1/4 mile (< .01) and 1/8 mile (< .05) from touchdown with night altitude error variability at least twice that recorded during the day. By day, pilot approaches were consistently above glide slope while approximately 1/4 of all night landings were below glide slope. Pilot perceptual ability and experience factors resulted in significant multiple correlations for predicting day lateral error performance. It was concluded that an empirical criterion of pilot landing performance was necessary to gain insight into the radically different visual and perceptual environments encountered in day and night carrier landings. (Author)

AD-636 732 Field 1B
CFSTI Prices: HC$1.00 MF$0.50
Army Aviation Materiel Labs., Fort Eustis, Va.
A FLIGHT TEST PROGRAM TO INVESTIGATE METHODS OF IMPROVING COMPOUND HELICOPTER MANEUVER CAPABILITY.
Interim summary rept.
Apr 66, 11p 1R-29

Descriptors: (*Helicopters, Maneuverability), Flight testing, Loading (Mechanics), Performance (Engineering), Ailerons, Roll.

Identifiers: H-2 aircraft.

The report summarizes the preliminary results of a flight research program conducted on the UH-2 compound helicopter for the acquisition of data relative to improving the maneuver capabilities of compound helicopters. The subject program was conducted during the period from 6 October 1965 through 25 January 1966. A total of 25 flights, involving 13.2 hours of aircraft time were conducted. Detailed results and analysis thereof will be included in the final report currently in preparation. Specifically, the program encompassed three areas of technical significance. (1) Wing/rotor load sharing during development of load factor buildup in a series of programmed symmetrical pullup maneuvers. (2) Evaluation of automatic rotor load reduction by collective pitch reduction as a function of increasing load factor for a series of programmed symmetrical pullup maneuvers. (3) The use of aerodynamic control surfaces (ailerons) to augment rotor roll control power. (Author)

N66-13053 Field 1B
CFSTI Prices: HC$1.00 MF$0.50
Fiat S.p.A., Turin (Italy).
MINIMUM IDEAL AND ACTUAL SPECIFIC FUEL CONSUMPTION OF VTOL AIRCRAFT AND HELICOPTERS IN HOVERING.
by G. Gabrielli. Nov 65, 16p

Descriptors: *Fuel consumption, *Helicopter, *Vtol aircraft.

For abstract, see T 66 18.

PB-169 947 Field 1B, 1E
CFSTI Prices: HC$3.00 MF$0.75
Weather Bureau, Atlantic City, N. J.
AN ANALYSIS OF MODIFICATIONS TO RUNWAY VISUAL RANGE EQUIPMENT FOR LOW RVR VALUES.
Final rept.
by Matthew Lefkowitz, and Ernest E. Schalatter.
Feb 66, 91p
Proj. 450-402-01E
SRDS-RD-66-9

Descriptors: (*Runways, Visibility), (*Visibility, Monitors), (*Terminal flight facilities, Automatic), All-weather aviation, Landings, Meteorological parameters, Standards, Optical instruments, Ranges (Distance).

Identifiers: Runway visual range systems, Transmissometers.

Several transmissometer configurations using 250-foot baselines were compared to develop a system with capability of measuring very low values of runway visual range. Tests were conducted at Atlantic City, N. J., and Arcata, California. The existing 'standard' 500-foot baseline system was used as the comparison reference. The end-to-end dual system was considered most representative of the present standard. A single transmissometer system was judged to be less representative, primarily due to sampling differences. (Author)

1C. AIRCRAFT

AD-636 573 Field 1C
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
GROUND RESONANCE TEST PLAN.
Sep 63, 61p Rept. no. 128
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program, See also AD-636 574.

Descriptors: (*Vertical take-off planes, Vibration), Tests, Resonance, Test methods, Research planes.

Identifiers: V-5 aircraft.

This report describes the detailed plan for determining the experimental vibration characteristics of the U.S. Army Model XV-5A Lift-Fan Flight Research Airplane.

AD-636 574 Field 1C
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
STRUCTURAL ANALYSIS OF WING SECONDARY COMPONENTS.
Dec 63, 98p Rept. no. 138
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program, See also AD-635 695.

Descriptors: (*Vertical take-off planes, Structural properties), (*Wings, Vertical take-off planes), Research planes, Structural parts, Ducted fans, Oilerons, Flaps, Trailing edge, Doors.

Identifiers: V-5 aircraft.

Structural Analysis of the flap, aileron, wing fan closure doors, wing trailing edge, and wing fittings for the U.S. Army XV-5A lift fan research aircraft are presented in this report. For each component, a summary type analysis is presented primarily with the intent of giving structural configuration, final critical loading, and assumptions made. Structural proof tests were conducted satisfactorily on the basic wing, the fan doors, fan fittings, flap and aileron. (Author)

AD-636 609 **Field 1C**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE AN-22.
21 Mar 66, 6p FTD-TT-65-2053
TT-66-61920
Unedited rough draft trans. of Krasnaya Zvezda (USSR) 16 Jun p1 1965.

Descriptors: (*Jet transport planes, USSR), Specifications.

Identifiers: AN-22 aircraft.

The AN-22 is driven by four 15,000-hp turboprop engines and capable of cruising at 740 km/hr for a distance of 11,000 kilometers with a load of 45 tons. The maximum capacity of the hermetically sealed cargo chamber is 80 tons, 'equivalent to 720 passengers with their hand baggage'. The chief engineer for the AN-22 was Oleg Konstantinovich Antonov. The AN-22 is completely equipped for bad-weather flying, can take-off and maintain flight with three of its engines, and due to the special construction of its undercarriage (large wheel size and automatically controlled pressure), this aircraft can land on unpaved runways. The take-off distance is stated to be 1100 - 1300 meters.

AD-636 664 **Field 1C**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE TU-144.
21 Mar 66, 5p FTD-TT-65-2054
TT-66-61950
Unedited rough draft trans. from Rabochaya Gazeta (USSR) 16 Jun p1 1965.

Descriptors: (*Jet transport planes, USSR), Commercial planes, Supersonic planes, Specifications.

Identifiers: TU-144 aircraft.

The TU-144 was designed by A. N. Tupolev. This aircraft is intended to carry 120 passengers over a range of 6500 km at a cruising speed of 2500 km/hr. The TU-144 is to be as economical as subsonic airliners and will be manned by a crew of three who will have the benefit of the latest navigational aids and the help of electronic computers. The TU-144 will have a flying weight of 130 tons, will cruise at an altitude of about 20 km and is designed to take-off in a distance of 1900 meters.

AD-637 105 **Field 1C, 20K**
CFSTI Prices: HC$7.00 MF$1.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
STRUCTURAL MECHANICS OF AIRFRAME STRUCTURES.
by A. F. Feofanov. 26 Mar 66, 315p FTD-TT-65-1698
TT-66-62051
Stroitelnaya Mekhanika Aviatsionnykh Konstruktsii, unedited rough draft trans. of Aviatsionnyi Institut, Moscow. Trudy (USSR) v160 p1-284 1964.

Descriptors: (*Airframes, *Mechanics), USSR, Structural properties, Design, Rods, Numerical analysis, Stresses, Structures, Thermal stresses, Structural shells, Partial differential equations, Boundary value problems.

This volume is devoted to problems of structural mechanics and mathematical design methods for modern statically determinate and statically indeterminate airframe structures consisting of rods, thin walls and shells. Variational and finite-difference methods are examined as they apply to calculations for structures of this type. Engineering methods are presented for the design of solid wings and fuselages for aircraft with large cutouts. A special section is devoted to calculation techniques for structures operating under conditions of high temperature as a result of kinetic heating. A table of conversions between the units of the MKGSS (meter, kilogram-force, second) and SI (International) systems for the references is given at the end of the book. (Author)

AD-636 415 **See Field 4A**

AD-636 767 **See Field 13H**

1D. AIRCRAFT FLIGHT CONTROL AND INSTRUMENTATION

N66-10540 **Field 1D**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
SEPARATION STANDARDS IN THE NORTH ATLANTIC REGION, 1965-71, IN THE LIGHT OF RECENT MEASUREMENTS OF FLYING ERRORS.
by P. G. Reich. Nov 64, 37p RAE-TR-64043

Descriptors: *Atlantic Ocean, *Flight safety, *Standardization.

For abstract, see T 66 18.

PB-169 952 **Field 1D, 17G**
CFSTI Prices: HC$2.00 MF$0.50
Sierra Research Corp., Buffalo, N. Y.
CATEGORY III ALTITUDE MONITOR.
Final rept.
by Robert J. Theisen. Nov 65, 38p
Contract FAA/BRD-230
Proj. 114-52N
SRDS-RD-65-125

Descriptors: (*Altimeters, Monitors), (*Height finding, Monitors), Radio beacons, X band, Doppler effect, Antennas, Gain, Radar tracking, Flight tests.

The report covers the work on an altitude monitor, accomplished by Sierra Research Corporation during Phase II of Contract FAA/BRD-230. The objectives, as stated in Amendment 6 to this contract, called for the objectives of which were: (1) simultaneous altitude readout in both ground station aircraft, (2) reduction of airborne equipment weight, (3) two equipment designs, one providing airborne and ground readout for commercial aircraft, the other ground readout (only) for light aircraft, (4) higher accuracy of altitude readout, (5) go/no-go airborne indication, (6) lower-cost equipment, and (7) precise inner marker capability. Results were as follows: (1) ground readout was accomplished through the addition of an airborne FSR which returns the transmitted signal 30 mc from its original frequency, (2) airborne equipment weight was reduced to less than 5-1/2 lbs., (3) airborne equipment was miniaturized for light aircraft, (4) go/no-go airborne indication was designed into the airborne computer and flight-tested, and (5) the feasibility of precise inner marker capability was demonstrated. The two major problems were (1) doppler effect and (2) false airborne triggering, presumably due to ground radar interference. It was shown that the doppler effect is overcome by increasing the receiver bandwidth to 4 kc and that false airborne triggering is eliminated through raising the modulating frequency.

PB-170 758 **Field 1D**
CFSTI Prices: HC$6.00 MF$0.50
National Aviation Facilities Experimental Center, Atlantic City, N. J.
TRANSPORT AIRCRAFT: VERTICAL ACCELERATION DETECTION.
Technical rept.
by William A. Hiering, and Charles R. Grisel. Mar 66, 45p
Proj. FAA-530-006-01X
FAA-ADS-71

Descriptors: (*Accelerometers, Tests), (*Transport planes, Accelerometers), (*Vertical indicators, Accelerometers), Flight testing, Landing impact, Loading (Mechanics).

Three commercially available accelerometer systems designed to measure vertical acceleration were evaluated for transport aircraft use by performing a series of laboratory and flight tests. The test results indicated that the off-the-shelf systems failed to record the flight test accelerations satisfactorily. However, the essential physical characteristics required of a transport aircraft's vertical acceleration sensing and recording system were determined from the flight test data. It was concluded that a transport's accelerometer system should contain three accelerometer units. Two identical accelerometer units mounted on the left and right landing gear mounting structure to sense landing impacts, and one accelerometer unit installed at the aircraft's c.g. position to sense flight accelerations. Airworthiness inspection requirements, due to aircraft vertical accelerations, may be ascertained by performing an engineering analysis of the recorded accelerations and the aircraft limit load data. (Author)

PB-169 950 **See Field 17G**

1E. AIR FACILITIES

N66-17383 **Field 1E**
CFSTI Prices: HC$1.00 MF$0.50
Tokyo Univ. (Japan). Inst. of Space and Aeronautical Science.
AIR TRAFFIC CONTROL AUTOMATION IN JAPAN, VOL 30, NO. 7.
by M. Ito, M. Okada, and J. Tamiya. Oct 65, 19p
ISAS-398

Descriptors: *Japan, *Air traffic control, *Automation.

PB-169 947 **See Field 1B**

PB-169 948 **See Field 9E**

2A. AGRICULTURAL CHEMISTRY

AD-636 863 **Field 2A, 6C**
Army Biological Labs., Frederick, Md.
THE EFFECT OF POSTINOCULATION TEMPERATURE ON SEEDLING REACTION OF SELECTED WHEAT VARIETIES TO STEM RUST.
by K. R. Bromfield. 8 Feb 61, 5p

Descriptors: (*Wheat, *Puccinia (Rusts)), Temperature, Resistance (Biological), Diseases.

The rust reactions of seedlings of 87 varieties of wheat to Puccinia graminis var. tritici races 17, 38, and 56 were determined at greenhouse temperatures of 70 and 85F. With respect to a given race, the varieties were: (1) resistant at both temperatures, (2) susceptible at both temperatures, or (3) resistant at 70 but susceptible at 85F. Certain varieties that became susceptible at high temperature (temperature-sensitive varieties) were further tested at 70, 77, and 85F. Twenty varieties inoculated with race 17, 12 inoculated with race 38, and 15 inoculated with race 56 were resistant at 70F but susceptible at 77 and 85F. The reactions of 7 temperature-sensitive varieties to races 11, 15B, 17,

38, and 56 were observed within the critical temperature zone in which breakdown in rust resistance occurs (70-77F). Individual differences in behavior were noted among the various host-race combinations but, in general, the varieties were: (1) resistant at 70F, (2) mixed in reaction at 72-74F, and (3) susceptible at 76F. (Author)

AD-636 580 See Field 6F

2B. AGRICULTURAL ECONOMICS

AD-636 809 **Field 2B**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A SHORT SURVEY OF COLOMBIAN AGRICULTURAL DEVELOPMENT IN RECENT YEARS.
by Dalbert A. Fitchett. 25 May 66, 32p P-3370

Descriptors: (*Agriculture, *Colombia), Reviews, Rural areas, Economics, Population, Production, Commerce, Food, Geography.

For abstract, see T 66 18.

2D. AGRONOMY AND HORTICULTURE

AD-636 908 See Field 6C

PB-169 957 See Field 13B

2E. ANIMAL HUSBANDRY

AD-636 711 **Field 2E, 6M**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
PATHOGENESIS OF A MYCOPLASM INFECTION IN SWINE.
Final rept., 1962-1964.
by F. R. Robinson. Feb 66, 70p AMRL-TR-66-14
Proj. AF-6303
Task 630206
Doctoral thesis at Texas A and M Univ., College Station.

Descriptors: (*Swine, *Mycoplasma), Veterinary medicine, Infections, Etiology, Pathology, Rheumatic diseases, Joints (Physiology), Fluorescent antibody techniques, Serodiagnosis, Antigens + antibodies, Tissues (Biology), Body weight, Immunity.

A Texas isolate of Mycoplasma hyoarthrinosa was injected into Hampshire and Yorkshire pigs weighing 40 and 100 pounds. Pathologic lesions in all 40-pound pigs were absent or minimal. Hampshire pigs that were not deprived of colostrum at birth had the greatest response to the injected organism. Colostrum-deprived Hampshire pigs weighing 100 pounds elicited a response similar to Yorkshires that had not received colostrum at birth. An indirect hemagglutination plate test was used to monitor the serological response of these pigs to M. hyoarthrinosa. The serological response varied from none in several pigs to a titer of 1:640 in one 100-pound Hampshire pig 9 days postinoculation. The indirect fluorescent antibody technique was applied to the demonstration of M. hyoarthrinosa in swine tissues. Demonstration of the organism was accomplished and provided positive evidence that the organism can be present in joint cavities in the absence of microscopic lesions in adjacent tissues. When the organism invaded the synovial tissue, it elicited a cellular response. In young pigs weighing 100 pounds or less the Mycoplasma was isolated from joint fluids of clinically normal and histopathogically normal joints. When the organisms invaded the synovial tissues of pigs weighing 100 pounds or more, microscopic and gross lesions were produced. The poor antigenicity of this class of organism and the onset of immunologic maturity are important factors in the development of lesions in these animals. (Author)

AD-636 873 **Field 2E, 6M**
Army Biological Labs., Frederick, Md.
THE PATHOGENESIS OF RIFT VALLEY FEVER IN LAMBS.
by B. C. Easterday, M. H. McGavran, J. R. Rooney, and L. C. Murphy. 1 Aug 61, 10p

Descriptors: (*Rift valley fever virus, Mammals), (*Veterinary medicine, Rift valley fever virus), Diseases, Fevers, Biopsy, Histology, Biological assay, Necrosis, Liver, Blood.

Lambs 1 to 5 days old were inoculated intraperitoneally with Rift Valley fever (RVF) virus and then slaughtered serilly at four-hour intervals beginning 12 hours after inoculation. A thorough necropsy was performed on each lamb; gross observations were recorded and tissues were collected for histologic examination and virus assay. Observations by others that the primary lesion in RVF is focal hepatic necrosis were confirmed. The development of the hepatic lesions in lambs was correlated with the quantities of virus in the blood, liver, and other viscera, and with the febrile response. The levels of virus in the various tissues in conjunction with the histologic changes suggested that the liver was a primary site of virus multiplication. Data were not sufficient to indicate that the liver was the only site of virus multiplication. (Author)

AD-636 901 **Field 2E, 6E, 6M**
Army Biological Labs., Frederick, Md.
RIFT VALLEY FEVER: A ZOONOSIS.
by Leslie C. Murphy, and Bernard C. Easterday. 1961, 17p
Prepared in cooperation with Wisconsin Univ., Madison, Dept. of Veterinary Science and NIH, Bethesda, Md. Natl. Cancer Inst.

Descriptors: (*Rift valley fever virus, Diseases), Animals, Humans, Veterinary medicine, Distribution, Morphology (Biology), Pathology, Diagnosis, Therapy, Vaccines, Immune serums, Etiology.

Identifiers: Zoonosis.

For abstract, see T 66 18.

AD-636 476 See Field 6E

3A. ASTRONOMY

AD-636 793 **Field 3A**
CFSTI Prices: HC$1.00 MF$0.50
Owens Valley Radio Observatory, Calif. Inst. of Tech., Pasadena.
DIAMETERS AND POSITIONS OF THREE SOURCES OF 18-CM OH EMISSION.
by D. D. Cudaback, R. B. Read, and G. W. Rougoor. 1966, 10p Rept. no. 7
Contract Nonr-220 (19)
Prepared in cooperation with California Inst. of Tech., Pasadena, and Leiden Observatory (Netherlands). Observations of the Owens Valley Radio Observatory California Institute of Technology, Pasadena, Calif.

Descriptors: (*Radio astronomy, Position finding), (*Interstellar matter, Emissivity), Hydroxides, Line spectrum, Extraterrestrial radio waves, Brightness, Hydrogen, Ions, Netherlands.

Interferometer observations of three highly interesting 18-cm line sources gave an upper limit of 20 seconds of arc for their diameter. Therefore their brightness temperature must be at least 500,000K. Accurate positions for two objects were obtained. There might be a relation between the interstellar ionized hydrogen gas and the position of one of the sources. (Author)

N66-15618 **Field 3A**
CFSTI Prices: HC$3.00 MF$0.50
TRW Systems Group, Redondo Beach, Calif. Space Sciences Lab.
DEVELOPMENT OF AN ENGINEERING PROTOTYPE ION MASS SPECTROMETER FOR THE MASS ANALYSIS OF THE LUNAR ATMOSPHERE.
Final rept.
by R. H. Abramson, and R. W. Fredricks. 25 Sep 65, 60p STL-4190-6012-SU-000
Contract NASw-1022
NASA-CR-69480

Descriptors: *Lunar atmosphere, *Mass spectrometer.

For abstract, see T 66 18.

N66-15910 **Field 3A**
CFSTI Prices: HC$1.00 MF$0.50
Tokyo Astronomical Observatory (Japan).
PHOTOGRAPHIC OBSERVATION OF COMETS.
by H. Hirose, H. Kosai, and K. Tomita. 31 Mar 65, 9p Bull. no. 168, Ser-2

Descriptors: *Astronomical photography, *Comet, *Celestial observation, *Planet.

N66-15922 **Field 3A**
CFSTI Prices: HC$1.00 MF$0.50
Tokyo Astronomical Observatory (Japan).
BULLETIN OF SOLAR PHENOMENA, VOLUME 16, NO. 4, OCTORBER-DECEMBER 1964.
1965, 21p

Descriptors: *Ephemeris, *Radio emission, *Solar flare, *Sunspot.

N66-15952 **Field 3A**
CFSTI Prices: HC$1.00 MF$0.50
Tokyo Astronomical Observatory (Japan).
POLAR TUBE OBSERVATIONS DURING 1964.
by J. Matsumoto, F. Nemichi, and N. Sekiguchi. 31 Mar 65, 2p Bull. no. 170-Ser-2

Descriptors: *Astronomy, *Japan, *Star.

N66-16166 **Field 3A**
CFSTI Prices: HC$7.00 MF$2.00
Minnesota Univ., Minneapolis. Tycho Study Group.
REPORT OF AUGUST 1965 TYCHO MEETING.
Aug 65, 396p
Contract NSR-24-005-047
NASA-CR-69878
Prepared for Meeting, Boulder, Colo.

Descriptors: *Dust, *Electric field, *Lunar surface, *Thermal property, *Conference.

N66-16491 **Field 3A**
CFSTI Prices: HC$2.00 MF$0.50
Tokyo Astronomical Observatory (Japan).
SPECTRAL CLASSIFICATION AND THREE-COLOR PHOTOMETRY OF A-TYPE PECULIAR STARS.
by K. Osawa. 1965, 28p Ser-2-vol-9-no-3

Descriptors: *Astronomical photometry, *Spectral analysis, *Star, *Stellar spectrophotometry.

N66-17473 **Field 3A**
CFSTI Prices: HC$3.00 MF$0.75
Virginia Univ., Charlottesville. Leander McCormick Observatory.
DESIGN AND APPLICATIONS OF OPTICAL INTERFEROMETERS IN ASTRONOMY.
Final rept.
by L. W. Fredrick, P. H. Knappenberger Jr, and H. J. Wood III. 1966, 73p
Contract NGR-47-005-031
NASA-CR-70454

Descriptors: *Interferometer, *Optical instrument, *Photoelectric apparatus, *Stellar mass.

N66-17619 **Field 3A**
CFSTI Prices: HC$6.00 MF$1.25
Electro-Optical Systems, Inc., Pasadena, Calif.
ANALYSIS OF POTENTIAL SECONDARY EXPERIMENTS FOR A SOLAR-THERMIONIC FLIGHT TEST VEHICLE. VOLUME II-SCIENCE EXPERIMENTS CATALOG.
Final rept.
19 Nov 65, 220p EOS-6961-Final
Contract NAS7-100
NASA-CR-70097

Descriptors: *Solar power system, *Space science, *Experiment design, *Flight test vehicle.

AD-636 393 **See Field 3B**

AD-637 100 **See Field 14B**

PB-169 609 **See Field 17I**

3B. ASTROPHYSICS

AD-636 295 **Field 3B, 14E**
CFSTI Prices: HC$2.00 MF$0.50
Boeing Scientific Research Labs, Seattle, Wash.
INFRARED AND VISIBLE IMAGES OF THE ECLIPSED MOON OF DECEMBER 19, 1964.
Final rept., 25 Sep 64-31 Dec 65.
by John M. Saari, Richard W. Shorthill, and Thomas K. Deaton. Jul 66, 48p D1-82-0533
Contract AF 19 (628)-4371
Proj. AF-8602
Task 860201
AFCRL-65-886

Descriptors: (*Lunar eclipses, Infrared photography), (*Moon, *Infrared photography), Extraterrestrial topography, Surface area, Thermal properties, Optical images, Astrophysics, Infrared radiation.

The Moon was scanned with 10 second arc resolution at 0.45 and 10-12 microns during the total lunar eclipse of December 19, 1964. It was found that the lunar surface exhibits a surprising amount of thermal inhomogeneity. Hundreds of thermal anomalies were observed, most of which can be identified with bright craters or white areas. Certain maria and portions of maria were found to be thermally enhanced over their environs during the eclipse. The analog signals recorded on magnetic tape were used to make visible and infrared images from the scan data. (Author)

AD-636 390 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Palomar Observatory, Pasadena, Calif.
SOLAR SPECTROSCOPY AND SPECTROHELIOGRAPH CINEMATOGRAPHY.
Final scientific rept., 15 Apr 65-14 Apr 66.
by Harold Zirin. 20 May 66, 10p
Contract AF 19 (628)-5082
Proj. AF-7649
Task 764906
AFCRL-66-422

Descriptors: (*Solar atmosphere, Spectroscopy), (*Sun, Spectroscopy), Hydrogen, Solar spectrum, Motion picture photography, Photographs, Astrophysics.

Spectroheliograph movies on successive days in H alpha show persistent structure on the solar surface. H alpha limb spectra show interesting chromospheric structure. New auxiliary equipment for solar work was built for the 150 ft. solar tower spectrograph. (Author)

AD-636 393 **Field 3B, 3A, 3C**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
SURFACE CHARACTERISTICS OF THE MOON, MARS, AND VENUS: ANNOTATED BIBLIOGRAPHY.
Rept. no. 2 on ATD work assignment no. 79.
by Joseph Javis, and Daniel W. Michaels. 16 May 66, 64p ATD-66-53
TT-66-61891
Compiled from Soviet-Satellite open sources pub. 1963-66. Rept. on Surveys of Scientific and Technical Literature.

Descriptors: (*Moon, Surface properties), (*Mars (Planet), Surface properties), (*Venus (Planet), Surface properties), Bibliographies, Astronomical data, Radio astronomy, Photography, Space probes, USSR.

This annotated bibliography was compiled from Soviet-Satellite open sources published 1963-1966. It is the second report in a continuing series indicative of Soviet-bloc research of the surface characteristics of Mars, Venus, and the Moon with reference to light polorization and albedo measurement techniques and to radioastronomical investigations. Report No. 1 appeared as ATD Report P-65-6. The 110 bibliographic entries are listed alphabetically by author in four sections: I. The Moon (58 entries); II. Mars (28 entries); III. Venus (18 entries); IV. General (6 entries). An Author Index is included at the end of the report. Other information included: Photography of celestial bodies, photogrammetry, and photointerpretation in space investigations; unusual formation on Venus; radar observations of Venus; Martian canals; Mars satellites; volcanic activity on Mars; colorimetric comparison of asteroids and terrestrial rocks. (Author)

AD-636 428 **Field 3B**
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
ON THE HARMONIC ANALYSIS OF ABSOLUTE LUNAR ELEVATIONS.
Environmental research papers.
by Donald H. Eckhardt. 4 Jan 66, 8p AFCRL-ERP-207, AFCRL-66-467
Proj. AF-8654
Task 865401

Descriptors: (*Moon, *Photogrammetry), Terrain, Harmonic analysis.

Identifiers: Selenodetics.

Spherical harmonic analyses of the moon's shape are inconclusive because of the poor distribution and accuracy of available lunar elevation data. Systematic errors in these data may lead to false interpretations of the figure of the moon. (Author)

AD-636 774 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Rome Astronomical Observatory (Italy). Space Physics Research Center.
SOLAR MAGNETIC FIELDS.
Technical final rept. 1 Feb 64-31 Jan 66.
by Massimo Cimino. 31 Jan 66, 14p
Contract AF 61(052)-768
AFCRL-66-522

Descriptors: (*Solar atmosphere, Magnetic fields), (*Sun, Magnetic fields), Instrumentation, Astrophysics, Italy.

The research work was directed towards the following: (1) Perform necessary laboratory experiments, including a study on the Zeeman effect in absorption. Make observations of the sunspot and general magnetic fields of the sun. (2) Conduct a program of interpretation of the observations of solar magnetic fields. (3) Develop instrumentation as required for study of solar magnetic fields and associated solar phenomena. (4) Perform continous registration of chromospheric phenomena both in CaII-K and H alpha lines, as indirect study of the solar magnetic fields. (Author)

AD-636 862 **Field 3B, 20I**
CFSTI Prices: HC$6.00 MF$1.25
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.
HYDROMAGNETIC MODEL FOR THE SOLAR GENERAL CIRCULATION.
by Peter A. Gilman. 1 May 66, 221p Scientific-1
Contract AF 19 (628)-5816
Proj. AF-8666
Task 866601
AFCRL-66-316
Rept. on Planetary Circulations Project.

Descriptors: (*Solar atmosphere, *Magnetohydrodynamics), Sunspots, Atmosphere models, Mathematical models, Perturbation theory, Stability.

Observations of phenomena on the surface of the sun of widely varying time and space scales are reviewed. Some of the theories for the larger, more slowly changing features are also surveyed. It is suggested that a plausible alternative to these theories could result from suitable hydromagnetic generalizations of the equations which have proved fruitful in understanding the earth's atmospheric general circulation. An energetically consistent set of scaled equations for large scale hydromagnetic flow is obtained and studied. The system is perturbed about a zonal flow and toroidal magnetic field. Some general integral theorems for unstable and neutral normal modes are proved. The stability of two level baroclinic flow in a uniform magnetic field is studied. This is generalized by adding parabolic flow in the upper layer. Qualitative and order of magnitude comparisons are made between the theoretical results and the solar observations showing enough consistency to encourage further work. (Author)

N66-11771 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
OPTICAL PROPERTIES OF THE MOON'S SURFACE.
by B. W. Hapke. Jun 65, 34p CRSR-198
Grant NsG-382
NASA-CR-67973
Prepared for presentation at Conf. on Nature of the Surface of the Moon, Goddard Space Flight Center, Greenbelt, Md. Apr. 1965.

Descriptors: *Lunar surface, *Optical property, *Moon.

For abstract, see T 66 18.

N66-14664 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
PREDICTION OF THE DATES AND INTENSITIES OF THE NEXT TWO SUNSPOT MAXIMA.
by D. G. King-Hele. Nov 65, 15p RAE-TR-65244

Descriptors: *Intensity, *Sunspot cycle.

N66-16233 **Field 3B**
CFSTI Prices: HC$3.00 MF$0.50
Yale Univ., New Haven, Conn.
SOME CALCULATIONS PERTAINING TO THE FEASIBILITY OF MEASURING LUNAR HEAT FLOW.
Final rept.
by S. P. Clark Jr. Sep 65, 55p
Grant NsG-400
NASA-69825

Descriptors: *Heat flow, *Internal energy, *Lunar soil, *Thermal energy.

N66-16458 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
California Inst. of Tech., Pasadena.
ON THE OPTIMUM CHOICE OF CENTRAL VARIABLES IN PROBLEMS OF STELLAR STRUCTURE.

by J. Faulkner. 1964, 15p
Contract NONR-220 (47), Grant NGR-05-002-028
NASA-CR-69865

Descriptors: *Astronomy, *Numerical integration, *Stellar structure.

N66-16463 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
National Biomedical Research Foundation, Silver Spring, Md.
INVESTIGATION OF THERMODYNAMIC MECHANISMS FOR THE PRODUCTION OF COMPOUNDS ESSENTIAL FOR THE ORIGIN OF LIFE.
Quarterly technical rept. no. 1, 1 Oct-31 Dec 65.
by M. O. Dayhoff, R. V. Eck, and E. R. Lippincott. 1965, 38p
Contract NsR-21-033-002
NASA-CR-69965

Descriptors: *Planetary atmosphere, *Space environment, *Thermodynamic equilibrium, *Atmospheric composition.

N66-16501 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
Royal Astronomical Society, London (England).
A SURVEY OF RADIO SOURCES BETWEEN DECLINATIONS 20 DEG AND 40 DEG.
by J. D. H. Pilkington, and P. F. Scott. 1965, 48p
Prepared for Presentation in mem. of Roy. Astron. Soc., v69, pt 5.

Descriptors: *Astronomy, *Radio source, *Stellar radiation.

N66-16601 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
Melpar, Inc., Falls Church, Va. Space Systems Lab.
ANALYSIS OF THE F-CORONA ACCORDING TO THE MIE THEORY. PART I - MATHEMATICAL FORMULATION AND UNIQUENESS OF THE DERIVED THEORETICAL MODELS.
by R. R. Circle, and R. S. Powell. 18 Dec 65, 49p
Contract NASw-1206
NASA-CR-70148

Descriptors: *Interplanetary dust, *Mathematical model, *Zodiacal light.

N66-17089 **Field 3B**
CFSTI Prices: HC$4.00 MF$0.75
Stanford Univ., Calif. Radioscience Lab.
RADAR STUDIES OF THE CISLUNAR MEDIUM.
Scientific rept. no. 12, Dec 65-Apr 64.
by P. Yoh. Dec 65, 108p SEL-65-091
Grant NsG-377
NASA-CR-70322

Descriptors: *Doppler radar, *Radar measurement, *Cislunar space, *Faraday-doppler technique, *Polarized radiation.

N66-17231 **Field 3B**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
RADIATIVE EQUILIBRIUM IN PLANETARY ATMOSPHERES. II. AN ANALYSIS AND INTERPRETATION OF SOME VENUS OBSERVATIONS BASED ON A SINGLE REFLECTING CLOUD LAYER MODEL.
by F. Bartko, and R. A. Hanel. Sep 65, 68p
NASA-TM-X-55392, X-622-65-436

Descriptors: *Cloud cover, *Temperature distribution, *Thermal emission, *Venus atmosphere.

AD-636 360 **See Field 20J**

AD-636 507 **See Field 20J**

AD-636 545 **See Field 8N**

AD-636 619 **See Field 22A**

AD-636 675 **See Field 4A**

AD-637 075 **See Field 7D**

3C. CELESTIAL MECHANICS

AD-636 393 **See Field 3B**

4A. ATMOSPHERIC PHYSICS

AD-412 816 **Field 4A, 4B**
CFSTI Price: HC$6.60
RAND Corp., Santa Monica, Calif.
ANOMALOUS SOUNDS AND ELECTROMAGNETIC EFFECTS ASSOCIATED WITH FIREBALL ENTRY.
by Mary F. Romig, and Donald L. Lamar. Jul 63, 67p RM-3724-ARPA
Contract ARPA Order-189-61
N64-12681

Descriptors: (*Meteorites, Atmospheric electricity), (*Atmospheric electricity, Meteorites), Electromagnetic properties, Atmosphere entry, Sound, Propagation, Ozone, Electrical properties.

The problems of the nature and origin of certain hissing sounds and electromagnetic effects associated with the passage of very bright meteors or fireballs has long been of interest to meteor astronomers. This Memorandum describes these effects and discusses their possible origin from the standpoint of atmospheric electricity and re-entry physics. This study was motivated by the possibility that a better understanding of these phenomena will lead to new techniques for determining the size, nature, and path of any large body entering the earth's atmosphere. (Author)

AD-636 325 **Field 4A, 17I, 17H**
CFSTI Prices: HC$4.00 MF$1.00
Honeywell, Inc., Roseville, Minn. Systems and Research Center.
STUDY OF TECHNIQUES FOR DETECTION AND MEASUREMENT OF CLEAR AIR TURBULENCE.
Final rept., 15 Nov 62-30 Oct 65.
by Raymond E. Zirkle Jr. 18 Jan 66, 135p Rept. no. 1540-FR1
Contract AF 19 (628)-2376
Proj. AF-6670
Task 667007
AFCRL-66-115

Descriptors: (*Clear air turbulence, Radar tracking), (*Opdar, *Meteorological radar), Atmospheric motion, Optical tracking, Lasers, Backscattering, Doppler effect, Correlation techniques.

Two general ways in which laser optical radar (optar) might be useful for clear air turbulence detection were examined. The first method involves spectral analysis of doppler-shifted light, backscattered by moving particles, to provide measures of average and gust spectrum velocity components. The second method involves the mapping of particle formations arrayed in the atmosphere by correlates of rough flying conditions such as wind shear, the jet stream, mountain waves, etc. Calculations show that the particulate matter of the troposphere which dominates optical backscatter is dynamically suitable for the mapping of wind motions consistent with anticipated requirements of CAT detection. Experiments by other groups have shown that laser doppler methods can measure particle velocities in the laboratory. Experimental extensions of these techniques will be needed to apply the concept to aircraft. An experimental program with pulsed ruby laser optars was conducted. Particle arrays were detected in both laboratory and field environments, but no evidence was obtained indicating a correlation with turbulent conditions. Laboratory turbulence-generated refractive index changes were much higher than those encountered in the atmosphere. Field tests at Rollinsville, Colorado were inconclusive due to poor weather conditions. Many cloud returns were obtained, but they were not related to mountain waves or turbulence. Airborne optars should be used in further work of this type to provide mobility and to allow direct correlation between signals received and turbulence encountered. (Author)

AD-636 415 **Field 4A, 1C**
CFSTI Prices: HC$3.00 MF$0.75
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
UPPER ATMOSPHERE RESEARCH USING AIRCRAFT.
Special repts.
by George J. Gassmann, and Eugene W. Pittenger. Apr 66, 61p AFCRL-SP-44, AFCRL-66-292
Proj. AF-5631
Task 563114

Descriptors: (*Atmospheric sounding, *Airplanes), Ionosphere, Electron density, Ionospheric propagation, Radio waves, Sky brightness, Solar eclipses, Ionospheric disturbances, Nuclear explosions, Cosmic rays.

An existing airborne installation is described and its potentialities are outlined. The particular properties of a jet aircraft (movability, speed, altitude) combined with appropriate ionospheric sounding equipment (receivers, optical apparatus, magnetometer, and cosmic ray recorders) constitute a unique capability. After reviewing past results obtained from more limited airborne equipment, an outline of operations and objectives is given, pertaining to: Magnetic Shell Propagation, Arctic Radio Physics, Eclipse Effects, Dumping of Trapped Electrons, Equatorial Electrojet, Nuclear Detonation Effects, Ionospheric Drifts, Airglow and Cosmic Ray Surveys. (Author)

AD-636 530 **Field 4A, 18D, 22B**
CFSTI Prices: HC$3.00 MF$0.75
Utah Univ., Salt Lake City. Upper Air Research Labs.
ROCKET-BORNE AURORAL X-RAY INSTRUMENTATION.
by L. Carl Howlett. 28 Feb 66, 76p Scientific-2, UU-66-4
Contract AF 19 (628)-4995
Projs. AF-7663, 5710
Task 766303
AFCRL-66-162

Descriptors: (*Sounding rockets, *Nuclear radiation spectrometers), (*X-ray spectroscopy, *Aurorae), Atmospheric sounding, X-ray spectrum, Energy, Measurement.

An X-ray detector suitable for inclusion in a rocket payload for X-ray studies must be capable of measuring X-ray flux and energy spectrum between 1 and 10 A. The instrument must also be insensitive to acceleration, temperature changes, vacuum, and a flux of up to 10 to the 8th power electrons/sec sq cm ster having energies from 1 to 50 kev. Three practical types of detectors suitable for rocket flight are energy selective Geiger tubes, scintillation spectrometers, and proportional counters. Geiger tubes which are made sensitive over a relatively narrow range of energies by careful selection of fill gas and window material provide outputs which are easily handled electrically but at the sacrifice of energy resolution. The proportional counter system has the best energy resolution but also the lowest level output and, therefore, requires considerable care in shielding from extraneous sources of electrical noise. Flight systems using scintillation spectrometers and proportional counters telemeter the amplified and broadened pulses directly from the detectors. (Author)

AD-636 568 **Field 4A, 20H**
National Research Council of Canada, Ottawa (Ontario). Div. of Pure Physics.
THE CHARGE SPECTRUM AND INTERACTIONS OF RELATIVISTIC HEAVY NUCLEI IN THE PRIMARY COSMIC RADIATION.
by B. Judek, and I. J. Van Heerden. 11 Nov 65, 25p
NRC-8918

Descriptors: (*Cosmic rays, *Nuclei), Charged particles, Secondary emission, Upper atmosphere, Photographic emulsions, Particle trajectories, Canada.

The charge spectrum of relativistic heavy nuclei in the primary cosmic radiation was investigated in a stack of nuclear emulsions exposed over Texas at a ceiling height of 136,000 ft. Charges of 601 primary and of 203 fast secondary nuclei arising from fragmentations were determined. Using a 'range' criterion to count delta rays, charge resolutions up to Z = 15 were obtained. All of the tracks were followed through the stack and the interaction mean free paths in emulsion and the fragmentation probabilities evaluated for individual elements up to Z = 15. Using these probabilities, the relative abundances at the top of the atmosphere were 12.7 plus or minus 1.3% L nuclei ($3<Z<5$), 63.5 plus or minus 3.5% M nuclei ($6<Z< 9$), 13.6 plus or minus 1.6% H3 nuclei ($10< Z<15$), 1.7 plus or minus 0.5% H2 nuclei ($16<Z<19$), and 8.5 plus or minus 1.4% H1 nuclei ($Z>20$). It was found that the interaction mean free paths in emulsion of the M and H nuclei were about 10% lower than previous experimental and calculated values. The fragmentation probabilities were generally in agreement with previous determinations, except for a significantly high value for the fragmentation of H1 to L nuclei. (Author)

AD-636 593 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.50
Minnesota Univ., Minneapolis. School of Physics.
ANNUAL PROGRESS REPORT.
by Homer T. Mantis, James M. Rosen, F. C. Gillet, and T. J. Pepin. Jun 66, 57p AP-24
Contract Nonr-710 (22)
Rept. on Atmospheric Physics Research.

Descriptors: (*Atmospheric motion, Equations of motion), (*Dust, Atmosphere), (*Light transmission, Atmosphere), Scintillation, Meteorology.

CONTENTS: An experimental study of the equation of motion in the free atmosphere The vertical distribution of dust; Solar extinction; Dust collection from the stratosphere; and Stellar extinction and scintillation.

AD-636 675 **Field 4A, 3B**
CFSTI Prices: HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
POLAR OBSERVATIONS OF SOLAR COSMIC RAY EVENTS DURING THE IQSY.
by A. D. Goedeke, A. J. Masley, and G. W. Adams. 1966, 26p Douglas Paper-4066
Contract NSF-C-393
To be published in Space Research, VII, North Holland Publishing Co., Amsterdam, 1966.

Descriptors: (*Cosmic rays, Solar radiation), (*Solar radiation, *Protons), Polar regions, Atmospheric sounding, Solar flares, Measurement, Riometers.

Identifiers: International Years of the Quiet Sun.

During the period of the IQSY, January 1964 through December 1965, the sun remained quiet, producing very few energetic particles. There were many instances during the IQSY when low-energy detectors on satellites and space probes registered small intensity increases. However, a few of these 'events' were associated with protons of energies exceeding 10 MeV. Moreover, the maximum intensities (of E sub p > 500 keV) were typically 1 - 8/sq cm sec ster. Most of these events were below the threshold of riometer detection. The largest solar cosmic ray event observed in 1964 by polar-based riometers was that of March 16. This event was observed by 30 and 50 Mc/s riometers at McMurdo, Antarctica, and Shepherd Bay, N.W.T., Canada. The largest event in 1965 occurred on February 5 and was the largest during the IQSY. It was associated with a class 2 flare at about 1750 UT, February 5. The propagation time between the sun and earth was about one hour. This event was well observed by satellites, space probes, and riometers. This paper discusses primarily the February 5, 1965 event. Some discussion is given to the March 16, 1964 event, other small events during the IQSY, and the recent event in March 1966. (Author)

AD-636 792 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
National Committee for Space Research, Haifa (Israel). Radio Observatory.
QUICK DATA REDUCTION FROM FARADAY FADING RECORDINGS.
Technical note.
by I. S. Dror. 29 Apr 65, 19p TN-1
Contract AF 61 (052)-837
AFCRL-66-331

Descriptors: (*Electron density, *Ionosphere), (*Faraday effect, Data), Satellites (Artificial), Mathematical analysis, Israel.

From Faraday fading of signal received from satellites the electron content of the ionosphere can be calculated. While crossing the ionosphere, the polarisation plane is rotated by a certain angle omega. This angle can be evaluated from the recorded signal - for instance by counting the number of half-rotations from the point of zero omega as defined by the M - type anomaly. The parameters needed for calculating the electron content from omega are magnetic and geometric factors. Several methods have been developed for calculating the above-mentioned parameters assuming a certain distribution for the Earth magnetic field. This note describes a method of calculating constants capable of replacing the parameters needed for evaluating the electron content in a defined zone near the receiving station. Constants for calculating gradients in the total content are described using the same method. Those constants are evaluated for the Haifa station as an example for this method. (Author)

AD-636 964 **Field 4A, 20N**
CFSTI Prices: HC$2.00 MF$0.50
Alaska Univ., College. Geophysical Inst.
THE DETERMINATION OF THE DIURNAL VARIATION OF THE AURORAL BELT BY RADIO MEANS.
Scientific rept.
Sep 65, 35p UAG-R-170

Descriptors: (*Aurorae, Diurnal variations), (*Atmospheric sounding, Aurorae), Ionospheric propagation, Radio waves, Backscattering, High frequency, Very high frequency, Radar reflections, Geophysics.

Identifiers: F region.

Backscatter echoes in the high frequency portion of the radio spectrum exhibit a systematic southward movement in the evening and northward in the morning. Typically, the scattering belt lies about 78 degrees N geomagnetic latitude during the day, and moves south to 65 to 70 degrees at night. The extent of the southward movement correlates strongly with geomagnetic activity and, to a lesser degree, local time. No significant difference was found between summer and winter diurnal variations of the scattering belt. The scattering belt has been found to include the optical auroral belt; thus, it is concluded that there is no significant difference in the diurnal variation in the position of the summer and winter auroral belts for given levels of magnetic disturbance. The scattering belt was present on the College magnetic meridian during most of the two and one-half years' observations. This is interpreted as showing the optical auroral belt existed most of the time somewhere on the College meridian, and hence on others as well. Thus, the auroral belt during the solar activity minimum period existed as a more or less closed curve around the geomagnetic pole. When the latitudinal effects are considered versus local time, the auroral belt takes the form of an oval curve, the northernmost portion approximately on the noon meridian. The size of the oval at any time is proportional to the size of the disturbance. The scattering belts as determined from simultaneous College and Thule backscatter soundings over approximately reciprocal paths generally coincided. This result shows that simultaneous soundings in four to eight directions from the magnetic pole could be used to map the auroral belt completely around the earth at any given time. (Author)

AD-636 966 **Field 4A, 20N**
CFSTI Prices: HC$2.00 MF$0.50
Alaska Univ., College. Geophysical Inst.
COMPUTED HF AURORAL BACKSCATTER TRACES FOR VARIOUS DISTANCES.
Scientific rept.
Feb 66, 40p UAG-R-174

Descriptors: (*Aurorae, Radar scanning), (*Atmospheric sounding, Aurorae), Backscattering, Radar reflections, High frequency, Ionospheric propagation, Geophysics.

Computed ionospheric backscatter traces in the HF portion of the radio spectrum are illustrated for a number of distances between the auroral belt and the observing radar. The type, frequency range, and observed scattering height of HF auroral backscatter traces are strongly dependent upon the ionospheric propagation conditions existing between the auroral belt and the observer. Backscatter echoes produced in a given region of space by a single backscattering mechanism can have completely different range versus frequency characteristics when observed at sites located at different distances from the scattering region. Even though a given band of auroral-belt irregularities extends through both the E and F regions, it is possible that only E-scatter is detected at one distance, and F-scatter at another. Trace type, scattering height, and frequency range of the observed backscatter echoes are strongly dependent upon the distance between the auroral belt and the observer. (Author)

AD-636 971 **Field 4A, 22C**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
EXOSPHERIC DENSITIES NEAR SOLAR MINIMUM DERIVED FROM THE ORBIT OF ECHO 2.
Technical rept.
by G. E. Cook, and Diana W. Scott. Mar 66, 27p TR-66105

Descriptors: (*Upper atmosphere, Density), (*Atmospheric sounding, Upper atmosphere), Satellites (Artificial), Orbital trajectories, Drag, Solar wind.

Identifiers: Echo.

The density of the upper atmosphere at heights between 1080 and 1170 km is evaluated from the change in the orbital period of Echo 2 for dates between February 1964 and December 1965. The air density shows a pronounced semiannual variation, while the variation between day and night is unlikely to exceed a factor of 2. (Author)

AD-636 982 **Field 4A, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
SIMULATION OF CHEMILUMINESCENT REACTION OF NITRIC OXIDE WITH ATOMIC

OXYGEN IN A SUPERSONIC LOW DENSITY WIND TUNNEL.
Interim rept. for 1 Sep-23 Sep 65.
by Jan A. van der Bliek, and Robert A. Cassanova.
Aug 66, 68p AEDC-TR-66-105
Contract AF 40 (600)-1200
Projs. AF-7635, ARO-SB-0512
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Upper atmosphere, Simulation), (*Nitrogen compounds, Chemical reactions), (*Oxygen, Chemical reactions), (*Supersonic flow, Chemical reactions), Chemiluminescence, Wind tunnels, Sounding rockets, Wind tunnel models, Dissociation, Concentration (Chemistry).

Identifiers: Nitrogen oxides.

Low density wind tunnel tests were carried out at Mach 3 to simulate the release of nitric oxide in the upper atmosphere from a sounding rocket. The supersonic flow contained atomic oxygen, and the chemiluminescent reaction of O with NO was investigated. This interim report presents some of the details of the experimental arrangement and preliminary results of the first test series. (Author)

AD-636 983 **Field 4A, 20F, 7D**
CFSTI Prices: HC$1.00 MF$0.50
American Meteorological Society, Boston, Mass.
LIST OF TRANSLATIONS 1965: FOREIGN LITERATURE RELATING TO THE GEOPHYSICAL SCIENCES.
Research translation.
May 66, 22p
Contract AF 19 (628)-3880
TT-66-62027

Descriptors: (*Geophysics, Bibliographies), Scientific research, France, West German, Poland, USSR.

For abstract, see T 66 18.

AD-636 999 **Field 4A, 9E, 14B, 20I K**
CFSTI Prices: HC$5.00 MF$1.00
Utah Univ., Salt Lake City. Upper Air Research Labs.
ANTENNA IMPEDANCE IN THE IONOSPHERE.
by Alvin M. Despain. 13 May 66, 157p Scientific-3, UU-66-7
Contract AF 19 (628)-4995
Proj. AF-7663
Task 766303
AFCRL-66-412

Descriptors: (*Antennas, Electrical impedance), (*Atmospheric sounding, *Probes (Electromagnetic)), Ionosphere, Electron density, Radiofrequency, Probes.

The impedance of an antenna probe surrounded by ionospheric plasma is examined. A review of several physical plasma parameters, research techniques, some past experimental results, and various theories is presented. A need is shown for further theoretical sophistication. The theory develops the impedance of an electrically short, cylindrical antenna probe immersed in a warm, lossy, compressible, magneto-ionic, electron fluid. The results are examined and compared to previous work and are applied to several ionospheric experiments. Experimental results as interpreted by the theory are examined and the usefulness of the theory is thus demonstrated. In particular, the theory is shown to be of value in determining electron density, temperature, and collision frequency from RF probe measurements. (Author)

AD-637 001 **Field 4A, 20N**
CFSTI Prices: HC$3.00 MF$0.75
Deco Electronics, Cambridge, Mass.
OBLIQUE-INCIDENCE IONOSPHERIC INVESTIGATIONS.
Final rept., Mar 64-Apr 66.
by David Davidson. May 66, 74p Rept. no. 69-F-2
Contract AF 19 (628)-3267
Proj. AF-4603
Task 460309
AFCRL-66-381

Descriptors: (*Atmospheric sounding, Radio transmission), (*Radio transmission, *Ionospheric propagation), Radio waves, Electromagnetic wave reflections, Ionosphere.

Identifiers: F-region.

Oblique incidence ionospheric soundings originating at Puerto Rico, Norway and California have been recorded at Maynard, Massachusetts. The course of the F2 layer maximum observable frequencies for these paths are presented. In the case of the Puerto Rico path, the progress of the one-hop F2 layer junction frequency (JF) follows predictions closely, although the maximum observed frequency (MOF) departs appreciably from the JF in the summer months due to sporadic E, which frequently has a persistent character in that season. Preliminary results of relative amplitude measurements for the upper and lower rays of the Puerto Rico F2 returns are presented. (Author)

AD-637 004 **Field 4A, 7D, 20I**
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
THE APPROACH TO STEADY-STATE IONIZATION IN AIR.
by Alfred M. Kaufman. May 66, 43p Rept. no. 2-12-66-3
Contract Nonr-3368 (00)
Proj. NR-087-133

Descriptors: (*Upper atmosphere, *Gas ionization), Air, Chemical equilibrium, Transients, Electrons, Ions, Concentration (Chemistry), Recombination reactions, Reaction kinetics.

The deionization equations which describe the time history of electrons, positive and negative ion populations are a familiar topic to workers in the field of upper atmospheric physics. The common procedure with these equations has been to assume slow variation in the equation parameters. Then the population of each species is adequately described by a quasi-equilibrium value which also varies slowly with time. What, in effect, is used then is a steady-state approximation. The response of the system to transient rapid parameter variation or initial large departures from equilibrium are thus ignored. Unfortunately, the transient response of the system cannot always be neglected without seriously misrepresenting the physics. Therefore, it would be useful to know when such a neglect of transients can be justified. The main goal of the report is to present graphically for a series of altitudes between 0 and 100 km the information necessary to give a firmer basis for the decision to neglect transients. Included in the information presented within are the quasi-equilibrium concentrations of electrons and negative ions as well as various time constants associated with the deionization equations. All information is parametrized according to ionization rate which varies between 10 and 10 to the 12th power ion-pairs/cu cm. The altitude dependence is obtained from the 1959-ARDC model atmosphere and normal atmospheric chemistry is assumed throughout. (Author)

AD-637 129 **Field 4A, 20N**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Huachuca, Ariz. Research Div.
COMPUTER TECHNIQUES FOR ANALYSIS OF ATMOSPHERIC REFRACTIVITY.
Technical rept.
by Stanley H. Brown, Arthur V. Carlson, and Neil M. Schmitt. Jun 66, 28p
Task 1L0-13001-A91A-10
ECOM-6022

Descriptors: (*Atmospheric refraction, *Refractive index), Electromagnetic waves, Propagation, Atmosphere, Radio interference, Mathematical prediction, Digital computers.

Computer techniques were developed for the analysis of refractive variations in the atmosphere. By using such an analysis it is often possible to reduce or to eliminate completely the radiosonde measurements that would ordinarily be required to determine atmospheric refractivities. Program listings are provided and an illustration of an actual analysis is included. (Author)

N66-10660 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisburg, (So. Australia).
IONOSPHERIC DATA FOR SEPTEMBER 1964 FROM SALISBURG, SOUTH AUSTRALIA.
Oct 64, 26p WRE-CPD-1964/9/S/

Descriptors: *Ionospheric propagation, *Ionospheric irregularity.

For abstract, see T 66 18.

N66-10661 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisburg (So. Australia).
IONOSPHERIC DATA FOR SEPTEMBER 1964 FROM WOOMERA, SOUTH AUSTRALIA.
Feb 65, 28p WRE-CPD-1964/9/W/

Descriptors: *Ionospheric propagation, *Ionospheric irregularity.

N66-10931 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Adelaide Univ. (Australia). Dept. of Physics.
MOLECULAR OXYGEN DENSITY AND ULTRA-VIOLET ABSORPTION IN THE SOUTHERN ATMOSPHERE.
by J. H. Carver, P. Mitchell, E. L. Murray, and B. Rofe. 1965, 8p

Descriptors: *Electromagnetic absorption, *Oxygen, *Solar atmosphere, *Ultraviolet radiation, *Lyman alpha radiation, *Molecular absorption, *Solar radiation.

N66-12941 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
METHODS OF DETERMINING AIR DENSITY FROM SATELLITE ORBITS.
by D. G. King-Hele. Sep 65, 32p RAE-TR-65212

Descriptors: *Air, *Atmospheric density, *Density measurement, *Orbiting satellite, *Upper atmosphere.

N66-14175 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.75
Canadian Armament Research and Development Establishment, Valcartier (Quebec).
RESULTS OF THE NITRIC OXIDE SEEDING PROGRAM.
by G. B. Spindler. Sep 65, 85p CARDE-TR-538/65

Descriptors: *F layer, *Nitric oxide, *Oxygen, *Atmospheric composition, *Upper atmosphere, *Winds aloft.

N66-14491 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia).
THE (EVAPOTRON) AN INSTRUMENT FOR THE MEASUREMENT OF EDDY FLUXES IN THE LOWER ATMOSPHERE.

by A. J. Dyer, and F. J. Maher. 1965, 32p Phys. Tech. Paper no. 15

Descriptors: *Heat flux, *Lower atmosphere, *Measuring apparatus, *Water vapor.

N66-14616 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment (Australia).
IONOSPHERIC DATA FOR JANUARY 1965 FROM WOOMERA, SOUTH AUSTRALIA IONOSPHERIC DATA BULLETIN.
Jul 65, 29p CPD-1965/1/W/

Descriptors: *Australia, *Ephemeris, *Ionosphere.

N66-14617 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment (Australia).
IONOSPHERIC DATA FOR FEBRUARY 1964 FROM WOOMERA, SOUTH AUSTRALIA IONOSPHERIC DATA BULLETIN.
Aug 65, 29p CPD-196412/W/

Descriptors: *Australia, *Ephemeris, *Ionosphere.

N66-14618 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment (Australia).
IONOSPHERIC DATA FOR OCTOBER 1964 FROM WOOMERA, SOUTH AUSTRALIA IONOSPHERIC DATA BULLETIN.
Apr 65, 29p CPD-1964/10/W/

Descriptors: *Australia, *Ephemeris, *Ionosphere.

N66-14619 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment (Australia).
IONOSPHERIC DATA FOR NOVEMBER 1964 FROM WOOMERA, SOUTH AUSTRALIA IONOSPHERIC DATA BULLETIN.
Jul 65, 29p CPD-1964/11/W/

Descriptors: *Australia, *Ephemeris, *Ionosphere.

N66-14620 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment (Australia).
IONOSPHERIC DATA FOR DECEMBER 1964 FROM WOOMERA, SOUTH AUSTRALIA IONOSPHERIC DATA BULLETIN.
Apr 65, 29p CPD-1964/12/W/

Descriptors: *Australia, *Ephemeris, *Ionosphere.

N66-15575 **Field 4A, 4B**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisbury (Australia).
IONOSPHERIC DATA FOR JULY 1964 FROM WOOMERA, SOUTH AUSTRALIA. IONOSPHERIC DATA BULLETIN.
Jan 65, 32p CPD-1964-7 (W)

Descriptors: *Table, *Upper atmosphere, *Ionosphere, *Meteorology.

N66-15590 **Field 4A, 4B**
CFSTI Prices: HC$2.00 MF$0.50
TRW Systems, Redondo Beach, Calif. Space Physics Lab.
BALLOON EXPERIMENTS WITH THE STL FLIGHT PROTOTYPE LUMINESCENT CHAMBER.
Final technical rept.
by R. F. Doolittle. 1 Nov 65, 48p STL-4141-6004-RU-000
Contract NASw-743
NASA-CR-69438

Descriptors: *Balloon flight, *Luminescence.

N66-15623 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisbury (Australia).
IONOSPHERIC DATA FOR APRIL 1965 FROM WOOMERA, SOUTH AUSTRALIA IONOSPHERIC DATA BULLETIN.
Jul 65, 28p CPD-1965/4 (W)

Descriptors: *Australia, *Ionospheric sounding.

N66-15624 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisbury (Australia).
IONOSPHERIC DATA FOR NOVEMBER 1964 FROM SALISBURG, SOUTH AUSTRALIA IONOSPHERIC DATA BULLETIN.
Jul 65, 30p CPD-1964/11 (S)

Descriptors: *Australia, *Ionospheric sounding.

N66-16605 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.75
Utah Univ., Salt Lake City. Upper Air Research Lab.
FALLING SPHERE-RADAR MATHEMATICAL SIMULATION TECHNIQUES.
Final rept. 15 Dec-15 Aug 65.
by K. E. Phillips, and F. L. Staffanson. 1965, 80p
Grant NGR-45-003-016
NASA-CR-70144

Descriptors: *Computer program, *Mathematical model, *Motion equation, *Particle trajectory, *Radar tracking.

N66-16687 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Colorado State Univ., Fort Collins. Dept. of Atmospheric science.
THE INVESTIGATIONS OF THE TEMPERATURE AND SPECTRAL EMISSIVITY CHARACTERISTICS OF CLOUD TOPS AND OF THE EARTH'S SURFACE.
Semiannual progress rept. no. 2.
by W. E. Mlarlatt. Dec 65, 32p Technical paper-72
Contract NASr-147
NASA-CR-70053

Descriptors: *Earth surface, *Radiation measurement, *Spectral emission, *Atmospheric temperature, *Cloud cover, *Surface property, *Temperature measurement.

N66-16713 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
State Univ. of Iowa, Iowa City. Dept. of Physics and Astronomy.
THE AURORAL OVAL, THE AURORAL SUBSTORM, AND THEIR RELATIONS WITH THE INTERNAL STRUCTURE OF THE MAGNETOSPHERE.
by S. I. Akasofu. Nov 65, 49p Rept. no. 65-37
Grants NsG-201-62, NsG-233-62
NASA-CR-70030

Descriptors: *Auroral activity, *Geomagnetic storm, *Magnetosphere.

N66-16714 **Field 4A**
CFSTI Prices: HC$5.00 MF$1.00
Electro-Optical Systems, Inc., Pasadena, Calif.
ULTRA-HIGH ALTITUDE MEASUREMENT SYSTEMS FOR PRESSURE, DENSITY, TEMPERATURE, AND WINDS.
Final rept., Feb-Nov 63.
by G. A. Cato. 15 Jan 64, 173p EOS-3780
Contract NAS8-5226
NASA-CR-70020

Descriptors: *Free atmosphere, *High altitude pressure, *Atmospheric density, *Launch vehicle, *Temperature measurement.

N66-17096 **Field 4A**
CFSTI Prices: HC$4.00 MF$0.75
Geophysics Corp. of America, Bedford, Mass.
MEASUREMENTS IN THE IONOSPHERE DURING A SOLAR ECLIPSE.
Final rept.
by C. A. Accardo, P. J. McKinnon, L. G. Smith, and L. H. Weeks. Aug 64, 109p GCA-TR-64-14-N
Contract NASw-500
NASA-CR-70324

Descriptors: *Electron density, *Lyman alpha radiation, *Solar eclipse, *Ionospheric composition, *X-ray density measurement.

N66-17230 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE MOTION OF TRAPPED PARTICLES IN A DISTORTED FIELD.
by G. D. Mead. Oct 65, 25p NASA-TM-X-55391, X-640-65-434
Presented at advanced study inst. on radiation trapped in the earth's magnetic field, Bergen, Aug 65.

Descriptors: *Geomagnetic field, *Charged particle, *Particle motion, *Solar wind, *Trapped particle.

N66-17233 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
PARTICLE TRAJECTORIES IN MODEL CURRENT SHEETS. 2. ANALYTICAL AND NUMERICAL APPLICATIONS TO AURORAS USING A GEOMAGNETIC TAIL MODEL.
by T. W. Speiser. Nov 65, 52p NASA-TM-X-55395, X-641-65-451

Descriptors: *Geomagnetic field, *Trapped particle, *Mathematical model, *Particle trajectory.

N66-17895 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.50
Geophysics Corp. of America, Bedford, Mass.
MOLECULAR OXYGEN DENSITIES FROM ROCKET MEASUREMENTS OF LYMAN-ALPHA ABSORPTION PROFILES.
by L. G. Smith, and L. H. Weeks. Mar 66, 59p
Contracts NASw-820, NASw-500
NASA-CR-392

Descriptors: *Oxygen, *Solar radiation, *Upper atmosphere, *Absorption spectrum, *Density measurement, *Lyman alpha radiation.

AD-636 500 **See Field 14B**

AD-636 503 **See Field 20N**

AD-636 545 **See Field 8N**

AD-636 619 **See Field 22A**

AD-636 682 **See Field 7D**

AD-636 937 **See Field 4B**

AD-636 965 **See Field 20N**

AD-636 968 **See Field 9E**

4B. METEOROLOGY

AD-435 637 **Field 4B**
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.

THEORETICALLY PERMISSIBLE ALTITUDE AND SEASONS FOR THE OCCURRENCE OF CLOUDS NEAR THE MESOPAUSE.
by G. F. Schilling. Apr 64, 16p P-2899
N64-24 150
Prepared for presentation at the Symposium on Noctilucent Clouds, Stockholm (Sweden) 4-6 May 64.

Descriptors: (*Clouds, Upper atmosphere), Noctilucent clouds, Thermodynamics, Dust, Sublimation, Barometric pressure, Water vapor.

A thermodynamic exclusion principle is used to determine those regions in the earth's upper atmosphere where the formation of clouds due to condensation or sublimation of water vapor is or is not possible. The probability of occurrence of such clouds is then determined from model atmospheres as a function of altitude for different latitudes and seasons. The theoretical results correspond well with actually observed locations, frequencies, and altitudes of noctilucent clouds. It is shown that statistical analysis of certain noctilucent cloud data should not only permit experimental tests of the theoretical study, but also provide, by inference, information about variations of the mesopause altitude with latitude, season, and solar activity. (Author)

AD-471 018 **Field 4B**
CFSTI Prices: HC$2.60 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
GROUND TEMPERATURE OBSERVATIONS, BARROW, ALASKA.
by George W. Aitken. May 65, 22p Technical rept. TR-105

Descriptors: (*Surface temperature, Alaska), (*Alaska, Soils), Measurement, Surface temperature, Atmospheric temperature, Moisture, Permafrost, Periodic variations, Climatology, Terrain, Tables, Geography, Particle size, Thermal properties.

The report summarizes climatological, ground-temperature, and soil data obtained at Barrow, Alaska. The climatological data were obtained from U.S. Weather Bureau records. Various periods-of-record were used, the minimum being 10 years unless otherwise noted in the report. The ground-temperature data presented were obtained from daily observations during the years 1947 through 1956 with the soil data obtained from samples taken while drilling two holes: one in July 1946 and the other in October 1957. (Author)

AD-471 019 **Field 4B**
CFSTI Prices: HC$1.60 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
GROUND TEMPERATURE OBSERVATION, GULKANA, ALASKA.
by George W. Aitken. Nov 64, 19p Technical rept. TR-106

Descriptors: (*Surface temperatures, Alaska), (*Alaska, Soils), Measurement, Atmospheric temperature, Moisture, Permafrost, Periodic variations, Climatology, Terrain, Tables, Geography, Particle size, Thermal properties.

The report summarizes climatological, ground-temperature, and soil data obtained at Gulkana, Alaska. The climatological data were obtained from U. S. Weather Bureau records. Various periods-of-record were used, the minimum being 10 years unless otherwise noted in the report. The ground-temperature data presented were obtained from daily observations during the years 1952 to 1958, and the soil data were obtained from samples taken while drilling two holes; one in June 1946 and the other in February 1955. (Author)

AD-471 020 **Field 4B**
CFSTI Prices: HC$1.60 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
GROUND TEMPERATURE OBSERVATIONS, KOTZEBUE, ALASKA.
by George W. Aitken. Jun 65, 19p Technical rept. TR-108
Proj. DA-1V025001A13002

Descriptors: (*Surface temperatures, Alaska), (*Alaska, Soils), Measurement, Atmospheric temperature, Moisture, Permafrost, Periodic variations, Climatology, Terrain, Tables, Geography, Particle size, Thermal properties.

The report summarizes climatological ground-temperature and soil data obtained at Kotzebue, Alaska. The climatological data were taken from U. S. Weather Bureau records. Various periods of record were used with a minimum period of 10 years unless otherwise stated in the report. The ground-temperature data were obtained from daily observations during the period 1947-1958; and the soil data were obtained from samples taken during drilling operations in August 1946, July 1958, July 1962 and June 1963. (Author)

AD-636 409 **Field 4B, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Earth Sciences Div., Army Natick Labs., Mass.
SIMULTANEOUS OCCURRENCE OF HIGH TEMPERATURES AND HIGH DEW POINTS.
Technical rept.
by Arthur V. Dodd. Jun 66, 25p ES-25
Proj. DA-1V025001A129
USA-NLABS-TR-66-55-ES

Descriptors: (*Dew point, *Climatology), (*Atmospheric temperature, Climatology), Environmental tests, Armed forces research, Geography.

Available information on the joint occurrence of high temperatures and dew points are presented for 17 stations (7 in Asia, 7 in Africa, 2 in North America, and 1 in Australia) in order that the geographical distribution of high temperatures and associated humidities may be better known. This information will be used in a planned revision of AR 705-15 'Operation of Materiel under Extreme Conditions of Environment.' On the basis of these data it appears that the natural occurrence of dew points higher than 75F in conjunction with temperatures higher than 109F is very infrequent and should not be specified for guidance in design and testing of Army materiel except possibly for items which may be used in limited areas of the Persian Gulf and Red Sea littorals where extremely high temperatures and humidities have been observed or are assumed to occur. (Author)

AD-636 572 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Redstone Scientific Information Center, Redstone Arsenal, Ala.
MESOMETEOROLOGY AND THE POSSIBILITIES OF FORECASTING LOCAL WEATHER.
by Emma Bodolai, and Gusztav Goetz. 27 May 66, 14p RSIC-562
TT-66-61907
Trans. of Idojaras (Hungary) v66 n6 p361-6 1962.

Descriptors: (*Weather forecasting, *Atmospheric motion), Air mass analysis, Meteorology, Hungary.

Identifiers: Mesometeorology.

In the atmosphere various kinds of air movements are occurring, the dimensions of which, in space and time, are yielding a continuous spectral distribution. In the course of the past decade the main emphasis has been placed on the investigation of only two dimensional classes of atmospheric processes: namely of the so-called macrosynoptical and, on the other hand, of the microsynoptical ones. However, by the organization of some peculiar microsynoptical networks in the United States of America possessing a very high station density, attention was drawn to another dimensional class of movements in the atmosphere. This new realm, the investigation of which is forming the subject of mesosynoptics, is directly related to the occurrence of weather phenomena of a local character. It has been proved by experience that through the application of the techniques of mesosynoptical analysis and forecasting, the task of preparing short-range provisions of local weather phenomena is rendered much easier and a possibility is achieved for using a more objective type of procedure, while, up-to-now, the methods employed have been in the majority of cases entirely subjective in character. (Author)

AD-636 620 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON THE CORRELATION OF WIND SPEED FLUCTUATIONS IN THE TURBULENT ATMOSPHERE.
by Chen Chia-I. 4 Apr 66, 17p FTD-TT-65-607
TT-66-61931
Edited trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v33 n4 p426-34 1963.

Descriptors: (*Gusts, Mathematical analysis), Atmospheric motion, Wind, Velocity, Correlation techniques, China.

An approximate formula is derived for the relationship between wind-speed fluctuation correlation, the standard deviation, and the respective components of the wind-speed fluctuation for small gustiness. The calculation indicates that for the gustiness ordinarily encountered in investigation of the microstructure of atmospheric turbulence, the correlations of the standard quantities and the eddy components do not differ greatly. It is shown that the spatial correlation of the wind speed fluctuation can, in approximation, be replaced by the time correlation if the atmospheric turbulence is of small magnitude. The validity of the additional assumptions made regarding the atmosphere in the derivation of the formula is also discussed. (Author)

AD-636 918 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Emmanuel Coll., Boston, Mass. Oriental Science Library.
THE BUDGET OF THE ATMOSPHERIC RADIATION ENERGY. OVER EASTERN ASIA. 1. THE BUDGET OF SOLAR RADIATION ENERGY OF THE EARTH AND THE ATMOSPHERE.
Revised ed., research translation.
by Chen Lung-shun, Wen Yu-pu, Kung Chih-pen, and Sun Sau-chung. Jan 64, 38p Emm-65-34
Contract AF 19 (628)-5073
TT-66-62017
Revision of manuscript submitted 16 Oct 63. Trans. from Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v34 n2 p146-61 1964.

Descriptors: (*Solar radiation, Climatology), (*Climatology, China), Far East, Atmosphere, Meteorology.

This paper which is the first part of a study on the budget of the atmospheric radiation energy over eastern Asia discusses the following three problems: (a) From the experimental data of the absorption spectra of water vapor presented by Howard, Burch and Williams (1), a formula suitable for the manual computation of the absorption of solar radiation is obtained and compared with the Mugge-Moller formula. (b) The absorption energy of solar radiation and the heating rate for January and July from the surface to 100 mb for 39 stations over eastern Asia are computed. By incorporating a correction for cloud cover, a further attempt is made to evaluate the atmospheric absorption of radiation reflected by the earth's surface and the distribution of absorption energy in the entire troposphere. (c) The distribution of planetary albedo over China and the budget of solar radiation energy of the earth-atmosphere system are discussed

in terms of surface total radiation and albedo data for China during the years 1958-60 and the computed atmospheric absorption energy. (Author)

AD-636 925 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Emmanuel Coll., Boston, Mass. Oriental Science Library.
A HYDRODYNAMIC MODEL FOR THE SEASONAL VARIATION OF THE GENERAL CIRCULATION AND LONG-RANGE FORECASTING.
Research translation.
by Chu Pao-chen. 12 Oct 57, 12p Emm-65-61
Contract AF 19 (628)-5073
TT-66-62019
Trans. from Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v29 n1 p57-62 1958.

Descriptors: (*Weather forecasting, Air mass analysis), (*Air mass analysis, *Hydrodynamics), Atmospheric motion, Meteorological parameters, Mathematical models, China.

A more realistic numerical model for long-range forecasting is set up from a system which includes relevant equations in hydrodynamics, thermodynamics and radiation transfer. The model includes the effect of friction and turbulence and makes allowance for the mutual adjustment between atmospheric motions and radiation balance. Systems of differential equations suitable for numerical integration are presented for a two-level model and a three-dimensional model separately. (Author)

AD-636 934 **Field 4B, 19A**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
IN ADDITION TO KNOWLEDGE ABOUT CYAMIC AND CYANURIC COMPOUNDS. II. ABOUT CYANURIC TRIAZIDE, (C3N12).
by Erwin Ott, and Ernst Ohse. Jul 66, 16p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-1C014501A32B
AERDL-T-1862-66, TT-66-62022
Trans. of Chemische Berichte (West Germany) v54 n2 p179-86 1921.

Descriptors: (*Cyanides, Synthesis (Chemistry)), (*N-heterocyclic compounds, Synthesis (Chemistry)), Chemical properties, Chemical reactions, Explosive materials, Decomposition, West Germany.

Identifiers: Cyanuric triazide.

For abstract, see T 66 18.

AD-636 937 **Field 4B, 4A, 14B**
CFSTI Prices: HC$3.00 MF$0.75
Singco, Inc., Burlington, Mass.
RESEARCH FOR THE DEVELOPMENT OF AIRBORNE ATMOSPHERIC AND METEOROLOGICAL INSTRUMENTATION.
Final scientific rept., 15 Jun 63-15 Mar 65.
by Calvin Y. Sing, and Charles L. D. Chin. Nov 65, 67p
Contract AF 19 (628)-3244
Projs. AF-7605, AF-8620
Tasks 760501, 862005
AFCRL-66-42

Descriptors: (*Meteorological instruments, Experimental design), (*Atmospheric sounding, Instrumentation), Airborne, Probes, Refractometers, Vortex thermometers, Pressure gages, Gusts, Anemometers, Fog, Clouds, Scientific research.

An airborne refractometer system was designed, fabricated, and installed in a C-131 type aircraft based at Patrick AFB, Florida along with a vortex thermometer, Rosemont total temperature probe, an aerograph sensing head, and a pitot-static pressure probe. A duplicate refractometer system was fabricated and delivered to the Cloud Physics Branch altitude chamber for use in calibrating the systems. A lightweight vortex thermometer was assembled and tested at the AFCRL Fog Field Site at Otis AFB. The AFCRL Fog Research Site at Otis AFB, Falmouth, Massachusetts, is fully described in this report for the 1964 Operation Cat Feet program during which most of the testing of instruments was performed. A comprehensive study of the factors involved with the measurement of gust velocities by various techniques is given in this report. Analysis of the acceleration data acquired by the Cloud Physics C-130 and the computed theoretical response of the aircraft show that this aircraft data can be used with a good degree of accuracy in determining the atmospheric gust velocities at lower frequencies of the gust spectrum. (Author)

AD-637 060 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A SPECTRAL ANALYSIS OF NORTHERN-HEMISPHERE FLOW DURING A LARGE-SCALE SYNOPTIC VARIATION.
by Chen Shou-jin. 4 Apr 66, 29p FTD-TT-65-606
TT-66-62034
Edited trans. from Ch'i Hsiang Hsueh Pao (Chinese People's Republic), v32 n4 p308-21 1962.

Descriptors: (*Air mass analysis, Northern Hemisphere), (*Atmospheric motion, Northern Hemisphere), Kinetic energy, Harmonic analysis, Meteorology, China.

The present paper presents a spectral analysis of the 500-millibar level in the northern hemisphere for a large-scale synoptic variation; the result indicates that the wave of wave number 5 plays an important role in the change of circulation. During a breakdown of zonal circulation, the angular-momentum transfer is northward, and accomplished largely by the wave of wave number 5. During the formation of zonal circulation, the transfer of angular momentum is southward and also accomplished largely by the wave of wave No. 5. (Author)

N66-14498 **Field 4B**
CFSTI Prices: HC$5.00 MF$1.00
Defence Research Board, Ottawa (Ontario). Telecommunications Establishment.
ALOUETTE I IONOSPHERIC DATA, ALOSYN, AUGUST 16 - AUGUST 31, 1963.
1965, 160p

Descriptors: *Alouette I Satellite, *Ionospheric sounding, *Table, *Synoptic meteorology.

For abstract, see T 66 18.

N66-17661 **Field 4B**
CFSTI Prices: HC$7.00 MF$2.00
Allied Research Associates, Inc., Concord, Mass.
METEOROLOGICAL INTERPRETATION OF NIMBUS HIGH RESOLUTION INFRARED (HRIR) DATA.
by J. C. Barnes, E. S. Merritt, R. B. Smith, and W. K. Widger Jr. Jan 66, 399p
Contracts NAS5-9554, NAS5-3253
NASA-CR-352

Descriptors: *Data analysis, *Infrared photography, *Meteorological satellite, *Nimbus satellite.

N66-18032 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Department of Transport, Toronto (Ontario). Meteorological Branch.
A CONVECTIVE INDEX IN RELATION TO LIGHTNING STRIKES IN NORTHWESTERN ALBERTA.
by W. K. Sly. 21 Apr 65, 17p CIR-4220, TEC-566

Descriptors: *Canada, *Lightning.

N66-18046 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Department of Transport, Toronto, (Ontario). Meteorological Branch.
SYNOPTIC SURVEY OF THE 1964 HAIL SEASON IN ALBERTA.
by G. Kozub, and C. E. Thompson. 21 Apr 65, 28p CIR-4219, TEC-565

Descriptors: *Hail, *Synoptic meteorology.

AD-412 816 See Field 4A

AD-449 874 See Field 14B

AD-451 781 See Field 13

AD-636 580 See Field 6F

AD-636 628 See Field 17I

AD-636 629 See Field 7D

AD-637 008 See Field 9F

N66-15575 See Field 4A

N66-15590 See Field 4A

5A. ADMINISTRATION AND MANAGEMENT

AD-636 512 **Field 5A**
CFSTI Prices: HC$1.00 MF$0.50
Princeton Univ., N. J. Dept. of Economics.
TIME-COST TRADEOFFS IN UNCERTAIN EMPIRICAL RESEARCH PROJECTS.
by F. M. Scherer. Mar 66, 13p
Grant NSF-GP-579
Pub. in Naval Research Logistics Quarterly v13 n1, NAVSO-1278 p71-82 Mar 1966.

Descriptors: (*Scientific research, *Costs), Uncertainty, Time studies, Scheduling, Research program administration.

This paper explores the relationship between research project cost and expected time to completion under various scheduling strategies; it assumes that many potential technical approaches to the research problem can be identified; and that each approach has a low but finite subjective probability of success. It is shown that under a variety of assumptions, expected time to project completion can be reduced, but that as a result expected project cost rises at an increasing rate. Some cases in which this convex time-cost tradeoff relationship might not hold generally are identified. When the time-cost tradeoff function is convex, the desirability of concurrent as opposed to series scheduling of approaches depends crucially upon the depth of the stream of benefits expected to be realized upon successful project completion. The deeper the benefit stream is, the more desirable concurrent scheduling is. (Author)

AD-636 529 **Field 5A**
CFSTI Prices: HC$7.00 MF$1.75
Materials Advisory Board, NAS-NRC, Washington, D. C.
AD HOC COMMITTEE ON PRINCIPLES OF RESEARCH-ENGINEERING INTERACTION.
Final rept.
Jul 66, 363p MAB-222-M
Contract SD-118

Descriptors: (*Research program administration, Department of Defense), (*Engineering, Scientific research), Social communication, Materials, Management engineering, Motivation.

Identifiers: Innovation (Technology).

Ten separate material developments were investigated and case histories are presented. A technique of analysis was developed and applied to the case histories to identify common elements

and patterns which might be used as guides by the Department of Defense to stimulate research-engineering interactions in the solution of materials problems. The analysis identified several elements which were prominent in many of the cases. Among these are: (1) Flexibility for the individual investigators to make major changes in direction and goals was frequently required; (2) Close and frequent communications between organizationally independent groups were often essential; (3) Key individuals played essential roles in bridging the geographical, organizational, and functional barriers between groups; (4) The recognition of an important need was most frequently the principal factor in stimulating research-engineering interactions; and (5) Often technical approaches were available and lay dormant for some time before their pertinence to a specific need was recognized. (Author)

AD-636 550 **Field 5A**
CFSTI Prices: HC$1.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
TOWARD A MULTI-STAGE INFORMATION CONVERSION MODEL OF THE RESEARCH AND DEVELOPMENT PROCESS.
Management science research rept.
by Richard G. Brandenburg, and Andrew C. Stedry. Jun 66, 19p
Contract Nonr-760 (24)
Proj. NR-047-048
Pub. in Naval Research Logistics Quarterly v13 n2, NAVSO-P-1278 p129-46 Jun 1966.

Descriptors: (*Management planning, *Research program administration), Model theory, Information theory, Scientific research.

Research and development activities in a business firm or government laboratory are portrayed as a multi-stage information generation and conversion process. A 'basic research' phase generates opportunities, in the form of findings in a set of scientific disciplines, which are available for subsequent exploitation. It is assumed that increments to information in a subject area are stochastic, proportional to the amount of knowledge which already exists in the area, and have values which are randomly distributed. An 'exploratory development' phase is viewed as a process of selecting a subset of alternative research opportunities, improving each opportunity in the direction of its applications, estimating the value of the improved opportunity and using these estimates to choose the exploratory development results to be implemented in engineering development. The 'engineering development' phase makes the value of exploratory results realizable without changing value or risk. Engineering development costs are assumed to increase as value increases. If exploratory development is not successful, additional costs in engineering development must be incurred to bring the design up to a minimum desirable level. The model is intended as a step toward formulating and analyzing problems in mangement planning and control of the several interrelated stages of the research and development process. (Author)

N66-17627 **Field 5A**
CFSTI Prices: HC$7.55 MF$2.25
Melbourne Univ. Parkville (Australia).
UNIVERSITY OF MELBOURNE RESEARCH REPORT, 1963.
1964, 455p

Descriptors: *University program, *Australia, *Research project.

For abstract, see T 66 18.

PB-169 959 **Field 5A, 13B**
CFSTI Prices: HC$4.00 MF$1.00
Peat, Marwick, Mitchell and Co., Chicago, Ill.
A STUDY TO IMPROVE MANAGEMENT FUNCTIONS.
Mar 66, 137p Rept. no. 0368
Sponsored by Mississippi State Highway Dept. in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Management engineering, Mississippi), Budgets, Personnel management, Flow charting, Roads, Buildings, Costs.

A general management research study was made of the Mississippi State Highway Department. The study was strongly oriented toward fiscal matters but also covered organization, general administration, personnel and merit systems, and property management. It is significant that operational procedures were improved sufficiently as a result of the study to enable an agreement for current billing/concurrent audit to be executed with the B.P.R. (Author)

AD-636 291 **See Field 13J**

AD-636 292 **See Field 13J**

AD-636 293 **See Field 13J**

AD-636 294 **See Field 13J**

AD-636 302 **See Field 13J**

AD-636 303 **See Field 13J**

AD-636 513 **See Field 12B**

PB-170 946 **See Field 5C**

5B. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-400 120 **Field 5B**
CFSTI Price: HC$24.70
RAND Corp., Santa Monica, Calif.
SOVIET NATIONAL INCOME AND PRODUCT IN 1965: THE GOALS OF THE SEVEN YEAR PLAN.
by Abraham S. Becker. Mar 63, 251p RM-3520-PR

Descriptors: (*Economics, USSR), (*USSR, Economics), Political science, Communism, Foreign policy, Probability, Counterinsurgency, Propaganda, Theory.

This memorandum presents a comprehensive calculation and analysis of the USSR's national income and product as planned by the Soviets for 1965. The memorandum includes a systematic and integrated analysis of the growth and resource-allocation objectives of the Seven Year Plan. Also presented are detailed estimates of investment in the Seven Year Plan period.

AD-636 299 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
RELATIONAL DATA FILE I: DESIGN PHILOSOPHY.
by M. E. Maron. Jul 66, 26p P-3408

Descriptors: (*Data processing systems, Design), (*Information retrieval, Language), Data, Correlation techniques, Computers, Data storage systems.

Contents: The role of language; Information processing for data retrieval; Inference-making and data retrieval.

AD-636 311 **Field 5B, 9B**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
RELATIONAL DATA FILE II: IMPLEMENTATION.
by Roger E. Levien. Jul 66, 26p P-3411
Prepared for presentation at the Annual National Colloquim on Information Retrieval (3rd), Pennsylvania Univ., Philadelphia, 12-13 May 66.

Descriptors: (*Information retrieval, Data processing systems), Data storage systems, Computer logic, Programming languages, Programming (Computers), Input-output devices, Magnetic tape, Set theory.

Identifiers: Time sharing (Computers), Sentences, FOREMAN.

The basic features of the Relational Data File are: Input is based in a system of forms on which data extracted from the sources is entered. Extraction and entry is performed by aides. Keypunched forms are collected on a magnetic tape that is then operated on by programs written in a special form retrieval and manipulation language, FOREMAN. Storage is of binary relational sentences derived from the input form tape by FOREMAN programs. Each sentence is named, and by entering the name of one sentence in another sentence, even non-binary relationships may be expressed. A computer code dictionary encodes each binary sentence as four computer words and full or partial copies of each sentence are entered into four separate files on disk. Each file is divided into subsections, called 'buckets,' and ordered according to one of the four sentence constituents - name, domain element, relation, range element. Only buckets, not individual sentences, are transferred between disk and core. Output processes are specified by the user in a procedural language whose elementary commands correspond to the basic operations of arithmetic, set theory, and logic. By combining those commands, the user may implement simple retrievals; compute counts, correlations, and trends; or execute complex inference schemes. (Author)

AD-636 380 **Field 5B, 9B, 5G**
CFSTI Prices: HC$2.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa.
DISEMINER: A DISTRIBUTIONAL-SEMANTICS INFERENCE MAKER.
by Sheldon Klein, Stephen L. Lieman, and Gary E. Lindstrom. 13 Jun 66, 37p
Contract SD-146, Grant PHS-MH-07722
Prepared in cooperation with Wisconsin Univ., Madison.

Descriptors: (*Semantics, *Decision making), Distribution, Programming (Computers), Information retrieval, Flow charting.

Identifiers: DISEMINER.

The purpose of the DISEMINER system is to explore the relation between lexical distribution criteria and semantics. It is hoped that the system, in its learning mode, will be useful in collecting data for deriving semotactic rules in a stratificational grammar. The system, written in ALGOL 20 and operational on the G-21 computer, is capable of learning distribution classes of lexical items through the processing of text, and using distributional criteria to answer questions that are broader than the context of the text processed. The methodology follows a line of research that was considered, but never followed, in early work on the SYNTHEX project. Distributional information is stored in terms of a dependency structure that differs from the SYNTHEX version in that dependency relations among stem types, rather than stem tokens, are stored in matrix format. That is, each stem is listed only once, and its dependency relations in all text processed by the system are associated with a single entry. (In the SYNTHEX system, separate dependencies are tabulated for each occurrence of a stem.) The stored relations include all possible transitive paths as well as direct ones. Because dependency analysis is weakly equivalent to phrase structure analysis, it is possible to view this data structure as a tabulation of the distributional potential of stems with respect to phrase structure criteria rather than criteria of linear contiguity. (Author)

AD-636 435 **Field 5B, 9B**
CFSTI Prices: HC$5.00 MF$1.00
HRB Singer, Inc., State College, Pa.

A GENERAL MODEL FOR SIMULATING INFORMATION STORAGE AND RETRIEVAL SYSTEMS.
by Charles R. Blunt, Robert T. Duquet, and Peter T. Luckie. Apr 66, 180p Rept. no. 352.14-R-2
Contract Nonr-3818 (00)

Descriptors: (*Information retrieval, *Models (Simulations)), Data storage systems, Programming (Computers), Model theory, Simulation.

This report presents the results of a research effort to explore the use of computer simulation as a quantitative tool for planning, analyzing and evaluating Information Retrieval systems. A general time-flow model has been developed that enables a systems engineer to simulate the interactions among personnel equipment and data at each step in an information processing effort. The input parameters for the simulation reflect the configuration of the system, the processing load of the system, the work schedule of the system, the work schedule of the personnel, equipment availability, the likelihood and effect of errors in processing and the location and availability of the system user. Simulation output provides a study of system response time (both delay time and processing time), equipment and personnel work and idle time and the location and size of data queues. Included within this report is a discussion of the simulation rationale, the modeling methodology employed and the input and output data of the computer simulation programs. Additionally, one example of a system simulation is presented as an illustration of the capability of this kind of tool in systems analysis. (Author)

AD-636 669 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ORGANIZATION AND USE OF A CENTRAL SPECIAL REFERENCE COLLECTION; MATERIAL FROM SCIENTIFIC TECHNICAL CONFERENCE: SELECTED ARTICLES.
by A. A. Prikhodko, and A. A. Leonova. 2 Mar 66, 18p FTD-TT-65-1291
TT-66-61955
Unedited rough draft trans. of mono. Sozdanie i Ispolzovanie Tsentralnogo Otraslevogo Spravochno-Informatsionnogo Fonda Materialy Nauchno-Tekhnicheskogo Soveshchaniya, Moscow, 1964 p55-9, 70-3.

Descriptors: (*Documentation, Costs), Construction, Machines, Classification, Subject indexing, USSR.

Contents: Accounting scientific-technical documentation as a basis of fulfilling reference-information funds; Experience in introducing branch UDK tables on machine construction.

AD-636 705 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SCIENTIFIC TECHNICAL INFORMATION: SELECTED ARTICLES.
by G. I. Goldgamer, A. Z. Nepomnyashchii, and L. B. Nisnevich. 21 Feb 66, 39p FTD-TT-65-1084
TT-66-61964
Unedited rough draft trans. of Nauchno-Tekhnicheskaya Informatsiya (USSR) n10 p10-4, 19-22 1964.

Descriptors: (*Pattern recognition, Programming (Computers)), (*Scientific research, Information retrieval), Reports, USSR.

Identifiers: Perceptrons.

Contents: Organization and method of thematic search and creation of information preceding new developments, by G. I. Goldgamer; Forced instruction of a perception with threshold elements, by A. Z. Nepomnyashchiy and L. B. Nisnevich.

AD-636 832 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
MULTI-LEVEL FILE STRUCTURE AS A FRAME OF REFERENCE FOR MEASURING USER INTEREST.
Professional paper.
by Alan A. Anderson. 12 Jul 66, 16p SP-2137
Prepared for presentation at the International Advanced Study Inst. on the Evaluation of Information Retrieval Systems at the Hague (Netherlands), 13 Jul 65.

Descriptors: (*Information retrieval, Acceptability), Documentation, Statistical analysis.

Identifiers: File structures, User surveys.

The logic of a multi-level file structure as a frame of reference for measuring user interest was tested in an exercise using 39 subject specialists to evaluate a random sample of 444 documents drawn from a population of approximately 50,000 documents. The measure (accessibility scale) proved to have low reliability (.44) but yielded multiple correlations as high as .75 with a cross validity of .68 with sets of 5 to 7 independent variables in the regression equations. (Author)

AD-636 833 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
USER REQUIREMENTS, PERSONAL INDEXES, AND COMPUTER SUPPORT.
Professional paper.
by Everett M. Wallace. 25 Jul 66, 12p SP-2535

Descriptors: (*Documentation, *Information retrieval), Acceptability, Abundance, Indexes, Computers.

Identifiers: User surveys, File structures.

This paper discusses the necessity for scientific and technical personnel to maintain personal files and the limitations of centralized information services in meeting the diverse and changing information access requirements of these personnel. A prototype service is described that uses a computer to aid individuals organize, maintain and find what is in their files by means of personalized, printed indexes. Through building a machine-readable record of user indexing practice, the service furnishes a means of identifying current user information requirements and for improved feedback of these requirements to centralized services. (Author)

AD-636 834 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
GUIDELINES FOR THE UTILIZATION OF STATISTICIANS IN THE DESIGN AND EXECUTION OF INFORMATION RETRIEVAL SYSTEM EVALUATION STUDIES.
Professional paper.
by Alan A. Anderson. 12 Jul 66, 14p SP-2556/000/00
Prepared for presentation at the International Advanced Study Inst. on the Evaluation of Information Retrieval Systems Proceedings at The Hague (Netherlands) 20 Jul 65.

Descriptors: (*Information retrieval, *Systems engineering), Design, Statistical analysis, Data storage systems.

Expressed desires of lecturers and members at the NATO Advanced Study Institute, July 1965, led the author to prepare guidelines for using statisticians in retrieval system evaluation studies. These guidelines describe questions by statisticians for information concerning the retrieval system environment. Specific statistician tasks are identified. The user support requirements are outlined. Constraints in the utilization of a statistician are discussed. The paper was conceived, reproduced, written, and distributed among the institute's two-week session. (Author)

AD-636 837 **Field 5B**
CFSTI Prices: HC$3.00 MF$0.75
System Development Corp., Santa Monica, Calif.
BREAKING THE COST BARRIER IN AUTOMATIC CLASSIFICATION.
Professional paper.
by L. B. Doyle. 1 Jul 66, 67p SP-2516
Contract AF 19 (628)-5166

Descriptors: (*Information retrieval, *Cost effectiveness), Automatic, Classification, Documentation, Programming (Computers), Digital computers.

A low-cost automatic classification method is reported that uses computer time in proportion to NlogN, where N is the number of information items and the base is a parameter. Some barriers besides cost are treated briefly in the opening section, including types of intellectual resistance to the idea of doing classification by content-word similarity. The second section explains the basic processes of document grouping by similarity, and discusses the advantages of the reported method over methods commonly experimented with. The operation of an iterative procedure using word profiles to progressively improve the grouping of content-word lists is described. Then some possible applications aside from document classification are enumerated. The final section begins by presenting theoretical underpinnings that explain the form taken by the components of the method. An account of the struggle to make the method work is sketched, followed by a cycle-by-cycle description of a feasibility demonstration. The conclusion states that mere cheapness is not enough and analyzes what researchers and developers might have to do before user acceptance of automatic classification can be assured. (Author)

AD-636 838 **Field 5B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
A USER'S GUIDE TO SURF: SUPPORT OF USER RECORDS AND FILES.
Technical memo.
by Everett M. Wallace. 24 Jun 66, 29p TM-2913

Descriptors: (*Documentation, *Information retrieval), Programming (Computers), Programming languages, Indexes, Abundance.

Identifiers: Users surveys, SURF.

SURF is an EDP-based service for Support of User Records and Files. It is implemented through SDC's MADAM programming language and system for the IBM 1401. It provides printed indexes reflecting the contents of user files. Users of the service index their files, fill out and submit input coding sheets to the service, and regularly receive consolidated index listings. SURF is quite flexible and adaptable to the diverse and changing needs of individuals in organizing, maintaining, and finding what is in their personal or office files. This document describes how to enter and use the service, provides illustrative examples of SURF indexes, and presents recommendations for indexing practice. (Author)

AD-636 871 **Field 5B**
Army Biological Labs., Frederick, Md.
SEMANTIC INFORMATION.
by Clifford J. Maloney. 22 Jan 62, 13p

Descriptors: (*Semantics, *Information retrieval), Documentation, Information theory, Coding.

Efforts to devise a calculus adequate as a foundation for information retrieval have taken a numer of forms. Semantic and signal information theory have in common the mathematical model consisting of an n-dimensional Euclidean space. In semantic information theory, however, probability

plays no part. What is of interest are those codes in which the transformed space is isomorphic to the original space under transformation and which preserve a 'match' relation. Code transformations are applied separately to each document and query vector in the system, and those documents which match a given query vector before the transformation must do so afterwards. Query vectors are distinguished from document vectors by the inclusion of one or more 'joker' symbols which match all codes in the given vector position. A major distinction between the communication and information retrieval context is shown in that, contrary to the former, shortened codes are only achieved at the cost of information in the latter. (Author)

AD-636 916 **Field 5B**
CFSTI Prices: HC$4.00 MF$0.75
Information Dynamics Corp., Reading, Mass.
SELECTIVE DISSEMINATION OF INFORMATION: REVIEW OF SELECTED SYSTEMS AND A DESIGN FOR ARMY TECHNICAL LIBRARIES.
Final rept.
by William A. Bivona, and Edward J. Goldblum.
Aug 66, 122p IDC-8074
Contract DA-19-129-AMC-957 (N)

Descriptors: (*Documentation, *Dissemination), (*Libraries, *Information retrieval), Design, Military requirements, Army, Reviews.

Identifiers: Selective dissemination of information.

This report presents an analysis of over eighteen small, intermediate, and large-scale systems for the selective dissemination of information (SDI). Systems are compared and analyzed with respect to design criteria and the following ten system parameters: information input, methods of indexing and abstracting, user interest profile construction, user group profile/document match strategy, profile maintenance and updating, products disseminated, operating statistics accumulated, ADP equipment utilized, and results reported. From the results of the analysis, criteria are drawn for the design of an SDI system that is generally applicable to a broad range of Army technical libraries. The design criteria are used as a basis for designing an SDI system which has the following desired characteristics: broad applicability, acceptance of information in many different formats, ability to yield high relevancy for specific information requirements, and high recall for general information requirements. This system requires a minimum automatic data processing configuration and operating personnel. Operating costs are minimized by utilizing standard graphic reproduction techniques for reproducing multiple copies of SDI notices. The user profile/document match strategy incorporates both Boolean and weighted selection criteria. (Author)

AD-636 977 **Field 5B, 9B**
CFSTI Prices: HC$2.60 MF$0.50
Itek Corp., Lexington, Mass. Research Div.
TECHNIQUES FOR MACHINE-ASSISTED CATALOGING OF BOOKS.
Special rept., rev.
by B. A. Lipetz, D. E. Sparks, and P. J. Fasana.
Oct 62, 25p SR-3-rev.
Contract AF 19 (604)-8438

Descriptors: (*Information retrieval, *Libraries), Catalogs, Data processing systems, Technical information centers, Air Force research, Documentation, Systems engineering.

This report summarizes techniques for the automatic production of catalog card sets from machine-interpretable records. The automatic techniques were developed to facilitate increased book cataloging without increasing manpower requirements at the Air Force Cambridge Research Laboratories (AFCRL) Research Library; the machine-interpretable records format was designed to be compatible with the requirements of other Air Force libraries and information systems as well as the AFCRL Research Library. Appendix A described the AFCRL Research Library's process flow. The recommended cataloging procedures described below are designed to be compatible with this, yet take advantage of labor-saving machine techniques. The recommended cataloging procedures preserve all current controls on the content and accuracy of the AFCRL Research Library catalog cards, and produce sets of catalog cards which are similar to those filed in the catalog to date. (Author)

AD-636 978 **Field 5B, 9B**
CFSTI Prices: HC$2.60 MF$0.50
Itek Corp., Lexington, Mass. Research Div.
INFORMATION PROCESSING OPERATIONS AND PROBLEMS AT THE AFCRL RESEARCH LIBRARY.
Special rept.
by B. A. Lipetz, D. E. Sparks, and L. F. Buckland.
Jul 61, 30p SR-1-Rev
Contract AF 19 (604)8438

Descriptors: (*Information retrieval, *Libraries), Data processing systems, Technical information centers, Air Force research, Documentation, Systems engineering.

This report discusses the applicability of automatic data-processing techniques to one particular Air Force scientific library, and the implications of machine-assisted cooperation among many scientific information handling groups. (Author)

AD-637 017 **Field 5B, 9B**
CFSTI Prices: HC$6.00 MF$1.25
Defense Intelligence Agency, Washington, D. C.
IDHS 1410 FORMATTED FILE SYSTEM: FILE MAINTENANCE AND FILE GENERATION MANUAL.
Revised ed.
1 Aug 66, 256p DIAM-65-9-1
Consists of four manuals: File Maintenance and File Generation Manual available as AD-637 017; Retreival and Output Manual, AD-637 018; Operator's Manual, AD-637 019. Programming Maintenance Manual available 1 Nov 66. FFS System Tapes and card decks available from DIA, ATTN: DIAMS-3 (SOSB).

Descriptors: (*Programming (Computers), Information retrieval), (*Information retrieval, *Data processing systems), Input-output devices, Programming languages, Operations research, Data storage systems, Management planning, Documentation, Records, Compilers.

Identifiers: IDHS 1410 file system.

The 1410 Formatted File System is a general purpose, flexible data handling system. It consists of a collection of specially developed programs coupled with the 1410/7010 Operating System. The 1410/7010 Operating System is an integrated set of programs and programming systems that finds widespread and diverse applications whenever the 1410 or 7010 Data Processing Systems are used. The fundamental purpose of the operating system is to enable the writing, assembling, and execution of programs with a minimum expenditure of programmer time, machine-operator time, and machine time.

AD-637 018 **Field 5B, 9B**
CFSTI Prices: HC$6.00 MF$1.25
Defense Intelligence Agency, Washington, D. C.
IDHS 1410 FORMATTED FILE SYSTEM: RETRIEVAL AND OUTPUT MANUAL.
Revised ed.
1 Aug 66, 229p DIAM-65-9-2
Consists of four Manuals: File Maintenance and File Generation Manual available as AD-637 017; Retreival and Output Manual, AD-637 018; Operator's Manual, AD-637 019. Programming Maintenance Manual available 1 Nov 66. FFS System tapes and card decks available from DIA, ATTN: DIAMS-3 (SOSB).

Descriptors: (*Information retrieval, *Data processing systems), (*Programming (Computers), Information retrieval), Input-output devices, Programming languages, Subject indexing, Data storage systems, Management planning, Documentation, Records, Compilers.

Identifiers: IDHS 1410 file system.

For abstract, see T 66 18.

AD-637 019 **Field 5B, 9B**
CFSTI Prices: HC$5.00 MF$1.00
Defense Intelligence Agency, Washington, D. C.
IDHS 1410 FORMATTED FILE SYSTEM: OPERATOR'S MANUAL.
1 Jan 66, 181p DIAM-65-9-3
Consists of four manuals: File Maintenance and File Generation Manual available as AD-637 017; Retreival and Output Manual, AD-637 018; Operator's Manual, AD-637 019. Programming Maintenance Manual available 1 Nov 66. FFS System tapes and card decks available from DIA, ATTN: DIAMS-3 (SOSB).

Descriptors: (*Information retrieval, *Data processing systems), (*Computer operators, Instruction manuals), (*Programming (Computers), Instruction manuals), Man-machine systems, Digital computers.

Identifiers: IDHS 1410 file system.

This manual has been developed as a reference and supplemental text in support of training IDHS 1410 Systems operators, and as an operator's guide. The 1410 data processing system, using the formatted file concept, provides a data handling system which simplifies and accelerates the development of the user's report. (Author)

N66-17584 **Field 5B**
CFSTI Prices: HC$1.00 MF$1.00
National Aeronautics and Space Administration, Washington, D. C.
CUMULATIVE INDEX TO NASA TECH BRIEFS, 1963-1965.
Feb 66, 138p NASA-SP-5021-02

Descriptors: *Bibliography, *Information, *Technology.

For abstract, see T 66 18.

PB-170 380 **Field 5B**
CFSTI Prices: HC$4.60 MF$0.50
Biological Sciences Communication Project, American Inst. of Biological Sciences, Washington, D. C.
PAGE COST POLICY OF BIOLOGICAL JOURNALS.
by Charles W. Shilling. Mar 63, 47p BSCP-9-63
NSF Scientific Documentation Project.

Descriptors: (*Biology, Periodicals), (*Periodicals, Costs).

PB-170 381 **Field 5B**
CFSTI Prices: HC$6.60 MF$0 .75
Biological Sciences Communication Project, American Inst. of Biological Sciences, Washington, D. C.
SUPPORT OF SCIENTIFIC RESEARCH AS ACKNOWLEDGED IN 100 SELECTED BIOLOGICAL JOURNALS.
by Charles W. Shilling. Jun 62, 65p BSCP-8-62
NSF Scientific Documentation Project.

Descriptors: (*Biology, Periodicals), (*Periodicals, Costs), Scientific research, Budgets, Federal budgets.

PB-170 715 **Field 5B, 6E**
CFSTI Prices: HC$6.00 MF$0.50
Wayne State Univ., Detroit, Mich. Library and Biomedical Information Service Center.

A STUDY OF THE USE OF WAYNE STATE UNIVERSITY MEDICAL LIBRARY, PART I.
by Vern M. Pings, and Fanny Anderson. May 65, 40p Rept. no. 10
NSF Scientific Documentation Project.

Descriptors: (*Medical research, Libraries), (*Libraries, Universities), Medicine, Periodicals, Indexes, Abstracts, Catalogs.

The purpose of this study was to discover how the existing Wayne State University Medical Library is used. Using the present estimates of student enrollment, the number of faculty, and the extension of community services in the coming decade the quantitative data collected is used to make better calculations about the future use of the Library than the intuitive guesses (expert though they may be) usually employed in designing a new library installation. Although the design for collecting data for this study included identifying the different groups who come to the Library, the purpose was not to identify the proclivities of the individual user, rather to identify how the present arrangement of the service, study, and storage areas are utilized.

PB-170 818 **Field 5B**
CFSTI Prices: HC$4.00 MF$0.50
Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
LECTURE SEMINARS IN THE INFORMATION SCIENCES, 1965-1966. SUMMARIES.
Jun 66, 10p Rept. no. 7
Grant NSF-GE-2569
Report on Curriculum for the Information Sciences.

Descriptors: (*Documentation, Symposia), (*Information retrieval, Education), Abstracts.

Identifiers: Information sciences.

The seminars were open to the public and had two major objectives: (a) to provide graduate students in the information sciences the opportunity to hear and discuss problems with persons working on the research frontier; and (b) to inform the campus community, as well as other local groups, of the problems and scope of the information sciences. Abstracts of the seminars are presented.

ORNL-NSIC-12 **See Field 13M**

ORNL-NSIC-14 **See Field 13M**

ORNL-NSIC-8 **See Field 13M**

ORNL-NSIC-9 **See Field 13M**

5C. ECONOMICS

AD-439 523 **Field 5C**
CFSTI Price: HC$1.10
RAND Corp., Santa Monica, Calif.
SCIENCE, TECHNOLOGY AND THE AUTOMATION EXPLOSION.
by Richard Bellman. May 64, 9p P-2908
Prepared for presentation at the Conference on Cybernetics and Automation in New York City, Jun 19-21, 1964.

Descriptors: (*Automation, Scientific research), Political science, Computers, Decision making, Economics, Sociology.

This paper presents some of the reasons why automation is a most serious problem to the economic and political stability of our society at the present time, and why the problem is becoming more acute with each passing day. By automation, we mean the ability to carry out operations of decision-making and technology with either no human supervision or else greatly reduced manpower requirements. Over the span of recorded history, every society has had to contend with automation and technological change. These changes have in some cases caused great human suffering, as in the case of the Industrial Revolution in England. We cannot depend upon things taking care of themselves with minor readjustments, as some economists and industrial experts say. This is based upon the tacit assumption that there is only one steady-state behavior which is stable. In a complex system such as ours there are many stable states, not all desirable. It is essential that we look ahead and plan for a desirable one. (Author)

AD-636 394 **Field 5C, 5D**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE SOVIETS TRY, TRY AGAIN. THE SOVIET ECONOMY AND THE 'NEW REFORM'.
by Ellen K. Weinstein. Jul 66, 12p P-3399

Descriptors: (*Economics, USSR), Management planning, Industrial production, Political science.

The results of the Seven Year Plan initiated by Nikita Krushchev in 1959 are discussed. Also, the objectives of the 1966-1970 plan, under the leadership of Premier Alexei Kosygin, are presented.

AD-636 947 **Field 5C, 15F, 15E**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
INDUSTRIAL RECOVERY TECHNIQUES.
by Stephen L. Brown. Apr 66, 84p
Contract OCD-PS-64-201
Proj. SRI-MU-4949-350
Report includes detachable summary.

Descriptors: (*Industries, *Mobilization), (*Civil defense systems, *Nuclear warfare), Industrial production, Vulnerability, Nuclear explosion damage, Damage assessment, Reclamation.

This report presents some generalized concepts concerning industrial models, industrial vulnerability to nuclear weapons effects, industrial recovery requirements, and industrial recovery procedures. Mathematical expressions relating manufacturing outputs to inputs of materials, of facilities, and of people are presented and used to develop measures of damage and guidelines for allocating recovery resources. More qualitative descriptions of industrial operational organization, damage assessment methods, methods for determining recovery requirements, and specific recovery procedures are also formulated. Recommendations are submitted concerning (1) operational countermeasures for industry and for civil defense organizations and (2) desirable further research efforts in industrial civil defense. (Author)

N66-11773 **Field 5C**
CFSTI Prices: HC$1.00 MF$0.50
Florida Univ., Gainesville. Bureau of Economic and Business Research.
ANALYSIS OF PERSONAL INCOME IN THE CAPE KENNEDY AREA.
Semiannual status rept. pt. 4, 1 Mar - 30 Jun 65.
by R. H. Blodgett. 14 May 65, 18p
Grant NsG-507
NASA-CR-67971

Descriptors: *Cape Kennedy, *Economics.

For abstract, see T 66 18.

PB-169 740 **Field 5C, 11G, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
ASPHALT AND VINYL ASBESTOS FLOOR TILE, A MANUFACTURING OPPORTUNITY IN CARROLL COUNTY, GEORGIA.
Technical rept.
by Harvey Diamond. Jan 64, 25p Project A-619-TR-6

Descriptors: (*Economics, Georgia), (*Georgia, Industries), (*Floor coverings, Industries), Asphalt, Composite materials, Vinyl plastics, Asbestos, Industrial plants, Costs, Commerce, Transportation, Labor.

Identifiers: Area redevelopment.

The annual market for asphalt and vinyl asbestos floor tile in the six southeastern states was approximately $17 million in 1961. It is estimated that consumption in the region will reach $23 million in 1968. None of the asphalt and vinyl asbestos floor tile used in the Southeast is manufactured in the Southeast. A Carroll County plant manufacturing asphalt and vinyl asbestos tile can realize greater savings in selling to the southeastern market than any existing plants because of the following factors: proximity to market (Atlanta), lower freight costs, and lower labor costs. Additional advantages of a Carroll County location for an asphalt and vinyl asbestos floor tile plant are first morning delivery service to the southeastern market, an ample supply of good quality labor, a record of low work stoppage, and the availability of financing and assistance from the Area Redevelopment Administration.

PB-170 946 **Field 5C, 5A, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Pacific Projects, Ltd., Tokyo (Japan).
SELF-SERVICE AND SUPERMARKET EQUIPMENT IN JAPAN.
Sep 65, 83p
Prepared in cooperation with Dept. of Commerce, Washington, D. C. Foreign Market Survey.

Descriptors: (*Commerce, Japan), (*Japan, Commerce), (*Distribution (Economics), Food), United States, Packaging, Air conditioning equipment, Refrigeration systems, Cooking devices, Television equipment, Packing materials, Cutting tools, Conveyors.

Identifiers: Supermarkets.

The objectives of the survey are to describe and measure the market in Japan for self-service and supermarket equipment. Although a sizable market for supermarket equipment is indicated it exists only in certain categories. Primary interest would be in business and accounting machines to increase administrative efficiency. Wrapping machines and materials as well as labelling machines would also find a good market considering the savings they would allow in handling and the more desirable appearance they would give to merchandise. Considering the number of handbills printed by self-service stores, printing and copying machines should be of considerable interest. In display cases, Japanese makers arre active but the advanced technology of U. S. Manufacturers and their long experience in the field of self-service operations has resulted in a number of licensing arrangements in this and other equipment categories. In general this survey has centered on the problem besetting self-service food stores rather than those of self-service clothing stores, because these present the greater opportunity for solutions through the import or licensing in Japan of U. S. developed equipment and management techniques.

PB-170 947 **Field 5C, 13I, 13H, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Soskuty (O. V.), Frankfurt am Main (West Germany).
ADVANCED METAL-WORKING MACHINE TOOLS AND ACCESSORIES IN THE FEDERAL REPUBLIC OF GERMANY.
Rept. for 8 Feb-8 Apr 66.
Apr 66, 60p
Prepared in cooperation with Dept. of Commerce, Washington, D. C. Foreign Market Survey.

Descriptors: (*Machine tool industry, Germany), (*Germany, Machine tool industry), (*Commerce, Germany), (*Machine tools, Germany), Industries, Metal forming presses,

Automotive industry, Aircraft industry, Steel industry, Electrical industry, Cutting tools, Tables, United States, Distribution (Economics).

The survey was conducted from February 8, to April 8 1966. It was undertaken to explore the market, technology and market potential of American metal working machinery in Germany. The investigation was extended to the entire metal cutting and metal forming field. The method followed was the interview with manufacturers of machine tools, users of machine tools, representatives of the industry, associations and scientists i.e. professors of technical universities. The economic indicators were explored from the official data available and from the study of literature.

PB-170 948 **Field 5C, 13F, 13C, 8F**
CFSTI Prices: HC$3.00 MF$0.50
Trancu (Theodore C.) and Associates, Milan (Italy).
MATERIAL HANDLING AND CONVEYING EQUIPMENT IN ITALY.
by Theodore C. Trancu. 15 Oct 65, 54p
Prepared in cooperation with Department of Commerce, Washington, D. C.

Descriptors: (*Commerce, Italy), (*Vehicles, Italy), (*Conveyors, Italy), (*Italy, Commerce), Materials, Handling, Containers, Control systems, Automatic, Valves, Distribution (Economics), United States.

It is concluded that the following items have a good sales potential in Italy: Automatic transmission self-propelled trucks. Very small and small self-propelled pulling vehicles. Heavy duty self-propelled trucks. Self-propelled trucks. Self-propelled trucks designed to do special jobs, or parts and/or attachments to such trucks. Double track overhead conveyors, integrated and equipped with accessories. Belt, roller and/or other types of conveyors, new in design, with automatic controls and auxiliary equipment. Containers, special in design and made to perform spcial jobs. A long list of components which, when adapted to an existing overhead conveyor system or to other types of conveyors, may improve their efficiency, capacity and/or speed of operation. Automatic controls, valves, etc.

PB-170 949 **Field 5C, 13I, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Squires (C. K.), Stockholm (Sweden).
METAL WELDING AND CUTTING EQUIPMENT IN SWEDEN.
May 66, 24p
Contract 160-TC
Prepared in cooperation with Foreign Market Survey, Dept. of Commerce, Washington, D. C.

Descriptors: (*Welding, Industrial equipment), (*Cutting, Industrial equipment), (*Commerce, Industrial equipment), (*Sweden, Industrial equipment), Automation, Industries, Arc welding, Cutting tools, Soldering, Tables.

The study considers the lively and important Swedish welding and cutting equipment industry and market, and possibilities for imports of American welding and cutting equipment into this market. The present somewhat limited role of the US in this market is considered, with some American equipment being sold by Philips, one of the main suppliers. Competition from other European countries - Germany and Scandinavia in particular - is looked at, as is that from Sweden. The conclusion is drawn that a Trade Center Show should have a strongly technical, advanced penchant. The ordinary ranges of welding equipment are in good supply; new developments, or advanced types, typified by some of the US equipment shown at the 1965 Technical Exhibition in Essen, Germany, and which received high praise, should constitute the main emphasis.

PB-170 950 **Field 5C, 13I, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Trancu (Theodore C.) and Associates, Milan (Italy).
PLANT AND EQUIPMENT MAINTENANCE MACHINES APPARATUS AND PRODUCTS IN ITALY.
by Theodore C. Trancu. 1 Jun 66, 33p
Prepared in cooperation with Department of Commerce, Washington, D. C.

Descriptors: (*Commerce, Italy), (*Italy, Maintenance Equipment), (*Maintenance equipment, Italy), Industrial plants, Vacuum cleaners, Carpets, Rugs, Cleaning, Industrial equipment, Floors, Distribution (Economics).

A study of the Italian market for plant and equipment Maintenance machines shows that considerable confusion exists in the minds of potential users regarding the whole problem of plant and/or office cleaning. Cleaning, even in a big industry or business, may be taken care of with labor equipped with brooms and mops. Larger domestic floor polishers and vacuum cleaners are the first mechanized approach to the problem; and industrial machines and equipment of various sizes and makes are the ultimate in efficiency. US made cleaning and maintenance equipment is up against stiff technological and economic competition with Dutch, Danish and Swedish machines, all of which seem to be designed to perform the various jobs under Italian conditions. It becomes necessary to exercise a high powered sales pressure on the Italian operators in an effort to convince them of the economic advantages in acquiring the machines under review. Such pressure may be made directly through appropriate literature and demonstrations, or indirectly by dealers and cleaning contractors.

PB-170 951 **Field 5C, 13D, 13I, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Essor International, Paris (France).
PAKAGING MACHINERY AND EQUIPMENT IN FRANCE.
Oct 65, 36p
Prepared in cooperation with the Dept. of Commerce, Washington, D. C. Foreign Market Survey.

Descriptors: (*Packaging, Industrial equipment), (*France, Commerce), (*Commerce, France), Containers, Distribution (Economics), Packing Materials, Paper, Glass, Wood, Plastics, Aluminum, Tin, Fibers (Natural), Tables, United States.

The study indicates that American equipment has not been adequately presented in France and the French market has not been systematically prospected by American firms. The share of the market by American equipment could be a great deal larger, especially for equipment developed for specific operations to which European equipment is badly adapted. The price factor does not constitute a major obstacle, at least as long as the machine permits higher productivity. The Packaging Show (Salon de l'Emballage) is recommended as the best means to get American equipment known and appreciated.

PB-170 952 **Field 5C, 14E**
CFSTI Prices: HC$4.00 MF$0.75
Fry Consultants, Inc., Frankfurt Main (West Germany).
PHOTOGRAPHY IN INDUSTRY IN THE FEDERAL REPUBLIC OF GERMANY.
29 Oct 65, 115p
Prepared in cooperation with Department of Commerce, Washington, D. C.

Descriptors: (*Commerce, Germany), (*Photographic equipment, Germany), (*Germany, Photographic equipment), (*Photography, Industries), Distribution (Economics), United States, Photographic materials, Microfilm, Cameras, Photographic processing equipment, Lenses, Camera components and accessories, Projectors, Printing, Photographic chemicals, Photogrammetry, Photographic driers, Infrared photography.

The purpose of this market survey was to develop general marketing information that would be helpful to potential U. S. exporters of photographic equipment and supplies used for industrial purposes, and to point out those areas within the broad field of industrial photography where increased efforts on the part of U. S. industry will yield higher export sales. This information takes the form of outlining the size and structure of the German market for photography in industry. The study indicates there is a large undeveloped market for photography in industry in Germany. This potential arises because the uses of photography common to the U. S. have been only barely introduced in Germany. Because German industry is in many ways as advanced technically as is that of the U. S., similar needs for photography would be expected.

PB-170 953 **Field 5C, 13A, 8F**
CFSTI Prices: HC$3.00 MF$0.50
Trancu (Theodore C.) and Associates, Milan (Italy).
HEATING AND VENTILATING EQUIPMENT IN ITALY.
by Theodore C. Trancu. 2 Aug 65, 51p
Prepared in cooperation with Department of Commerce, Washington, D. C.

Descriptors: (*Commerce, Italy), (*Italy, Commerce), (*Cooling and ventilating equipment, Italy), (*Heaters, Italy), Radiators, Boilers, Control, Pipes, Vents, Ventilation, Filters (Fluid), Diffusers, Sealing compounds, Ducts, Valves, Heating, Air conditioning equipment, United States, Distribution (Economics).

The Italian HEVAC industry, starting with central heating components (boilers, radiators, pipes, tubes, ducts, burners, etc.) to air-conditioning and ventilating ones such as (Ventilators, single packed air conditioners, etc.) is fully capable of producing most of the equipment and/or parts thereof needed on the market. Any new items, or pieces of equipment, original in design, new in concept and economic to the buyer (both in terms of purchasing price and maintenance) are of course bound to stir interest. The Italian industry is still young, needs additional experience, both in manufacturing and promotion, and much of it can still come from the U. S. Big freezing units are still a U. S. 'monopoly'. In addition controls are the great field in which U. S. imports will always be welcome. A U. S. Trade Center sponsored HEVAC show is not bound to lead to any immediate boosts in the sales of U. S. Manufactured products, but it will greatly help in acquainting people in the trade, with the latest developments in the technology, application, and uses of the most modern U. S.-HEVAC equipment.

PB-170 954 **Field 5C, 13I, 13H, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Pacific Projects, Ltd., Tokyo (Japan).
FACTORY MODERNIZATION EQUIPMENT IN JAPAN.
Sep 65, 75p
Prepared in cooperation with Dept. of Commerce, Washington, D. C. Foreign Market Survey.

Descriptors: (*Commerce, Japan), (*Japan, Commerce), (*Factories, Japan), (*Manufacturing methods, Japan), Computers, Production, Control systems, Machine tools, Machine tool industry, Chemical industry, Temperature control, Electric switches, Hydraulic systems, Paint applicators, Filters (Fluid), Distribution (Economics), United States.

Electronic computers for production process control which usually feature real-time data processing and data transmission functions for either on-line or off-line control, are just on the threshold of wide acceptance. Numerical controls for machine tools may find only a limited opportunity in Japan. Control instruments in a wide range for

the chemical and other process industries are now produced locally, and imports are declining rapidly. Unit controls of United States origin, such as thermostats, temperature regulators, pressure switches, flow switches, and level switches, may find a good market in Japan. Electric control components, such as relays, magnetic switches, limit switches, timers, etc., are produced locally in a wide variety. Hydraulic components and equipment industry in Japan has expanded at a rapid pace and is expected to continue to do so for several more years. Paint spraying equipment. A growth rate at the same level as the growth in paint output of 10% yearly is estimated. Filtration equipment and filter media. A gradual increase is noted in the production of chemical processing filters amounting to $9.0 million in 1964, though the number of units produced has dropped from a level of 9,500 to 6,400 in 1964.

PB-170 955 **Field 5C, 13C, 13F**
CFSTI Prices: HC$6.00 MF$1.50
Adams (T. F. M.) and Co., Ltd., Tokyo (Japan).
MATERIALS HANDLING EQUIPMENT IN JAPAN.
Jun 66, 271p
Prepared in cooperation with Department of Commerce, Washington, D. C.

Descriptors: (*Commerce, Japan), (*Japan, Industrial equipment), (*Industrial equipment, Japan), (*Handling, Industrial equipment), Vehicles, Fork-lift vehicles, Towing vehicles, Cargo vehicles, Transportation, Conveyors, Tractors, Hoists, Containers, Packaging, Materials, Distribution (Economics), United States.

Japanese makers, with the help of foreign technical licenses, are now manufacturing almost all categories of materials handling equipment. In general, the technical level is quite good and compares favorably with German products but for some of the latest product categories, the newly developed technology of US products is superior. Unquestionably a certain number of good import prospects exist in the materials handling field particularly in the unusual and the innovations areas. The majority of US makers have found that the best approach to the Japanese market is through licensing agreements or some type of domestic production.

PB-170 956 **Field 5C, 7A, 13I, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Makrotest S.p.A., Milan (Italy).
INDUSTRIAL CHEMICAL PROCESSING EQUIPMENT IN ITALY.
Aug 65, 65p
Prepared in cooperation with Dept. of Commerce, Washington, D. C. Foreign Market Survey.

Descriptors: (*Chemical industry, Italy), (*Italy, Commerce), (*Industrial equipment, Chemical industry), Chemistry, Petroleum Industry, Cleaning compounds, Tables, Plastics, Synthetic rubber, Fibers (synthetic), Drugs.

The Italian chemical industry is in a stage of significant technical and economic evolution, owing to increased domestic demand, and the pressure of Common Market competition. U. S. producers of chemical processing equipment are considered to be in a strong competitive position vis-a-vis other potential suppliers in view of their advanced technology, production techniques, fast delivery terms, and ability to fulfill demands for unusual sizes and specialized demands. The product areas deemed most favorable for U. S. promotion are: instruments and micro-instruments for regulation and control, oscillographs, chromatographic equipment, industrial X-ray apparatus, equipment for extreme operating conditions, and such standard equipment as piping components, heat and air exchangers, and machinery of special size and performance characteristics. New firms entering the market should be prepared to expend several years of promotional effort, utilizing such media as specialized trade fairs, ads in trade journals and a liberal distribution of technical literature and brochures.

AD-636 434 **See Field 8F**

AD-636 454 **See Field 11J**

5D. HISTORY, LAW, AND POLITICAL SCIENCE

AD-414 727 **Field 5D**
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.
THE NUCLEAR EUROPE MYTH.
by Malcolm W. Hoag. May 63, 14p P-2743

Descriptors: (*Nuclear warfare, Control), Political Science, War potential, Deterrence.

The report states that European consensus on a nuclear force emerges from negotiations open to all in NATO, and the McMahon Act becomes the impediment to new partnership with a united Europe, the U. S. should establish acceptable conditions for its amendment. Nuclear aid to France and the United Kingdom should be debated on its own merits rather than as aid to an non-existent European Defense Community.

AD-415 229 **Field 5D**
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.
BRITAIN AND THE ALLIANCE.
by H. A. DeWeerd. Aug 63, 14p P-2779
Prepared for presentation at Conference of the World Affairs Council of Northern California, Sheraton-Palace Hotel, San Francisco, August 20, 1963.

Descriptors: (*Political Science, Military strategy), (*Military strategy, Political Science), (*Great Britain, Military Strategy), Government (Foreign), Economics, Western Europe, Deterrence.

The report discusses Great Britain's relations with the North Atlantic Treaty Organization in the light of the Nassau Conference, the collapse of Common Market negotiations, and other events. These developments provide a vantage point from which to inquire into the state of the alliance. The discussion concentrates on the military aspects of the alliance, rather than the economic and political aspects. The crucial military problem for the NATO alliance is how to adjust to changes in the strategic balance which have taken place since 1949, when the alliance began.

AD-636 453 **Field 5D, 15G**
CFSTI Prices: HC$5.00 MF$1.00
RAND Corp., Santa Monica, Calif.
THE SOVIET MILITARY SCENE: INSTITUTIONAL AND DEFENSE POLICY CONSIDERATIONS.
by T. W. Wolfe. Jun 66, 196p RM-4913-PR
Contract AF 49 (638)-1700

Descriptors: (*Political science, USSR), (*Military strategy, USSR), Defense systems, Leadership, Government (Foreign), Communism, Foreign policy, Officer personnel, Attitudes, Armed forces (Foreign), Vietnam, Warfare, Arms control, National defense.

The study of the Soviet military scene is concerned mainly with two broad categories of questions. First, it examines those pertaining to institutional relationships between the military and civil authority and to the character of the military as a sociopolitical and pressure group, inquiring into factors that heighten the cohesion of the military community as well as institutional attitudes and groupings which tend in some degree to dilute the semmingly monolithic character of the armed forces. Secondly, the study deals with a range of questions affecting the development of Soviet defense policy. Among these are revival of the military policy debate which began in the Khrushchev era, the tenor of Soviet strategic thinking under the new regime, the Vietnam crisis, Soviet arms-control diplomacy, and, finally, the prospect of changes in the Soviet outlook that may bear significantly upon the military stance adopted by the Soviet Union in support of its policy objectives during the next decade or so.

AD-636 671 **Field 5D, 5J**
CFSTI Prices: HC$3.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
HOW TO ELIMINATE THE SURVIVALS OF THE PAST AND TO BUILD A NEW TYPE OF MAN.
by A. B. Sakharov. 17 Feb 66, 58p FTD-TT-65-421
TT-66-61956
Unedited rough draft trans. of mono. Borba s Perezhitkami-Borba za Novogo Cheloveka, Moscow, 1963 32p.

Descriptors: (*Communists, Attitudes), (*Social psychology, USSR), Law, Culture, Humans, Behavior, Communism, Propaganda, Psychological warfare, Government (Foreign).

For abstract, see T 66 18.

AD-636 959 **Field 5D, 15G**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE ROLE OF THE MILITARY IN COMMUNIST CHINA'S EXTERNAL POLICIES: A STUDY KIT FOR THE AMERICAN ASSOCIATION OF UNIVERSITY WOMEN.
by Alice L. Hsieh. Jul 66, 18p P-3412

Descriptors: (*China, Foreign policy), (*Political science, China), Threat evaluation, War potential, Military strategy, Handbooks.

For abstract, see T 66 18.

AD-637 124 **Field 5D**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
INTERNATIONAL STABILITY.
by Daniel M. Weiler. Aug 66, 12p P-3420

Descriptors: (*United Nations, *Foreign policy), Stability, Government (Foreign), Cold war, Arms control, Political science.

International stability is defined as a condition of international relations in which inter-state violence is substantially nonexistent, and where there is low likelihood of this condition changing unexpectedly to any significant degree. The peace keeping role of the United Nations is discussed.

AD-636 394 **See Field 5C**

5G. LINGUISTICS

AD-636 319 **Field 5G, 9B**
CFSTI Prices: HC$2.60 MF$0.50
Moore School of Electrical Engineering, Pennsylvania Univ., Pittsburgh.
DETECTION OF GENERATIVE AMBIGUITIES IN CONTEXT-FREE MECHANICAL LANGUAGES.
by Saul Gorn. 1962, 27p
Contract AF 49 (638)-951, Grant NSF-G-14096
AFOSR-3481
Prepared for presentation at IFIP Congress 62 Munich, Germany, Session 39 - Symposium on Languages for Processor Construction August 27-September 1, 1962.

Descriptors: (*Context free grammars, Programming languages), Syntax, Semantics, Flow charting, Data processing systems, Input-output devices, Magnetic tape, Algorithms.

The author considers the problem of detecting those words in a 'context-free' mechanical language which can be derived from the defining 'productions' in essentially more than one way. The problem of finding a single algorithm accepting the generative specifications of such languages, and determining in a finite time whether or not such 'ambiguities' exist, is known to be unsolvable. The author, however, by defining the 'generative levels' with respect to the production system for each word of the language, specifies a processor called a 'limited ambiguity detector' whose main component is a 'derivation generator'; the latter works with a mixed language including the object language and a portion of the syntax language belonging to the class of generalized prefix languages as recently defined by the author. Such a detector would be supplied by the user with a value of a natural number parameter n, and would find all ambiguities through level n, with print-outs which might read: 'level 375 is finished and all is well', or 'level 379 is finished, and the following words are ambiguous with the following derivations at levels less than or equal to 379'. This detector is a fairly efficient four-tape processor. The fact that it can be designed is useful information to 'standardizers' who want to certify, for unambiguity up to level n, specified context-free languages, such as the syntactic part of ALGOL. (Author)

AD-636 361 **Field 5G**
Wayne State Univ., Detroit, Mich.
SEMANTIC ALGORITHMS.
by Margaret Masterman. 1965, 95p
Contract N62558-1811
Proj. NR-049-162
Research supported in part by Office for Scientific and Technical Information, London (England) and National Research Council, Ottawa (Canada).

Descriptors: (*Semantics, *Computational linguistics), Algorithms, English language, Machine translation, Computers, Symposia.

For abstract, see T 66 18.

AD-636 508 **Field 5G, 9B**
CFSTI Prices: HC$7.00 MF$1.75
Wayne State Univ., Detroit, Mich.
PROCEEDINGS OF THE CONFERENCE ON COMPUTER-RELATED SEMANTIC ANALYSIS.
5 Dec 65, 342p
Proceedings of a conference held at the Sands Hotel in Las Vegas, Nevada December 3-5, 1965.

Descriptors: (*Semantics, *Programming (Computers)), (*Computational linguistics, Symposia), (*Machine translation, Semantics), Linguistics, Programming languages, Computers.

CONTENTS: Interfaces of language; The outlook for computational semantics; Some tasks for semantics; Structural semantics: Theory of sentential meaning; Semantic algorithms; Some quantitative problems in semantics and lexicology; Problems in automatic word disambiguation; Some semantic relations in natural language; Underlying structures in discourse; Multidimensional scaling and semantic domain; Semantic classes and semantic message forms; Semantic self-organization; A tag language for syntactic and semantic analysis; An approach to the semantics of prepositions.

AD-636 380 **See Field 5B**

5H. MAN-MACHINE RELATIONS

AD-636 364 **Field 5H, 9B, 9D, 17B K**
Lincoln Lab., Mass. Inst. of Tech., Lexington.
A GRAPHICAL SERVICE SYSTEM WITH VARIABLE SYNTAX.
by Lawrence G. Roberts. 1966, 4p MS-1420
Contracts AF 19 (628)-5167, ARPA Order-691
ESD-TR-66-162
Prepared for presentation at an ACM Programming Languages and Pragmatics Conference, San Dimas, California, August 1965.

Descriptors: (*Man-machine systems, Graphics), (*Graphics, Communication systems), Programming languages, Operators (Personnel), Display systems, Computers, Syntax, Language, Semantics, Information theory.

Man-machine interaction in many fields of endeavor should be greatly facilitated in the near future through the use of interactive graphical languages. To provide a variety of display scope communication procedures, a Graphic Service System which functions as a generalized graphical language translator, is being developed to aid the definition as well as the use of new graphical languages. (Author)

AD-636 480 **Field 5H, 6D, 9B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
A NEW TASK ENVIRONMENT FOR GAKU TEAMED WITH A MAN.
Technical memo.
by Aiko Hormann. 27 May 66, 26p TM-2311/003/00
Contract Nonr-4745 (00)
Proj. NR-348-009

Descriptors: (*Man-machine systems, *Problem solving), Game theory, Programming (Computers), Behavior, Feedback, Learning, Adaptive systems, Artificial intelligence.

Identifiers: GAKU.

An experimental environment designed for man/machine problem-solving is described. Criteria for an adequate experimental task environment are that it contain problematic features like those of the real world, that it be formalizable and controllable, and that it contain elements that are both familiar and unfamiliar to most adult humans. The experimental environment devised to meet these criteria is a four-dimensional four-in-a-row game called 'Shimoku.' The game contains scoring elements similar to poker, and moves are made by sliding or exchanging counters on the playing spaces of the 16 planes of the hypercube. It is anticipated that this environment will provide sufficient complexity and variability to serve as a vehicle for testing the Gaku program system and studying the behavior of man and machine when they function as an interacting problem-solving team. (Author)

PB-170 961 **Field 5H, 13F, 13B, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
A DIGITAL COMPUTER SIMULATION OF DRIVER OVERTAKING FOLLOWING AND PASSING.
Technical rept.
by M. Gordon Howat. 15 Jul 65, 98p CAL-VK-1938-V-1
Contract CPR-11-0637

Descriptors: (*Passenger vehicles, Operation), Motor vehicle operators, Performance (Human), Digital computers, Models (Simulations), Programming languages, Programming (Computers), Velocity, Statistical analysis, Flow charting, Mathematical models, Acceleration, Deceleration, Traffic, Roads.

A digital computer model of the driver-car interaction, omitting steering, was formulated for one car for the tasks of overtaking, following, and passing other cars. This formulation was implemented by a Fortran IV program in a general manner enabling a wide range of values to be entered as independent variables. Simulation indicated that the most important interaction occurred between the variables which determined the rate and manner of implementing accelerations and decelerations and the size of time increments between successive control responses. Certain dependent variables were found to be sensitive for reflecting the effect of input conditions in the formulated model. The following are listed in order of apparent sensitivity. (1) a. For the 'follow is restricted objective' (FIRO) -- deviation about relative velocity detection. b. For the unrestricted passing objective -- the number of cars passed. (2) The headway at the time of initiating passing. (3) Mean and variance of velocity. (5) Mean and variance of a measure of driving stress, YA-YAIN. It is clear that this program has merely laid the foundation for beginning a comparison with full-scale experiments. If comparable values of the independent variables are set for a given experiment and this simulation, the value of the latter, as a research tool, may become apparent immediately. (Author)

AD-636 993 **See Field 9B**

5I. PERSONNEL SELECTION, TRAINING, AND EVALUATION

AD-271 642 **Field 5I**
CFSTI Price: HC$5.60
Human Resources Research Office, George Washington Univ., Alexandria, Va.
DEVELOPMENT AND EVALUATION OF TRAINING METHODS FOR THE RAPID ACQUISITION OF LANGUAGE SKILLS.
by Eugene H. Rocklyn, Richard I. Moren, and Andre Zinovieff. Jan 62, 57p Research rept. no. 9
Contract DA-44-188-ARO-2
Proj. DA-0J-95-50-001

Descriptors: (*Teaching machines, Training devices), Language, USSR, Vocabulary, Speech, Military personnel, Prisoners.

This research explored the feasibility of machine-teaching enough of a foreign language to combat soldiers to enable them to obtain tactical information from newly captured prisoners of war. The course material used in the pilot study (Russian) was limited to tactical subject matter, presented by means of dual-track tape recorders, and arranged to build and sustain motivation and maximize learning efficiency without use of human instructors. The results of this study, as measured by both academic and job-simulated tests, support the feasibility of machine-teaching limited foreign language skills. The methodology developed has further possible application in foreign language teaching.

AD-636 328 **Field 5I, 5J**
CFSTI Prices: HC$2.00 MF$0.50
Army Enlisted Evaluation Center, Indianapolis, Ind.
FACTOR ANALYSIS OF THE COMMANDER'S EVALUATION REPORT.
by Vern W. Urry, and W. Alan Nicewander. May 66, 30p Technical Research Study-40
Proj. USAEEC-693

Descriptors: (*Army personnel, Psychometrics), (*Psychometrics, Factor analysis), Military psychology, Selection, Leadership, Personality, Motivation, Behavior.

A factor-analytic study was conducted to determine what the current Commander's Evaluation Report (CER) measures and what a revised CER should measure. For these purposes, samples from the 2 and 4 skill levels were used. Five interpretable factors were extracted at the 2 skill level. These were: Rater Bias or Halo Effect; Contribution to Group Effort; Dependability; Drive for Self-Improvement; and Military Propriety. Of the above factors, Contribution to Group Effort, Dependability, and Drive for Self-Improvement were most valid. At the 4 skill level, six interpretable factors were extracted. These were: Rater Bias or Halo Effect; Dependability; Direction of Group Effort; Drive for Self-Improvement; Motivation

for Military Life: and Personal Bearing. The factors, Direction of Group Effort, Drive for Self-Improvement, and Motivation for Military Life, were most valid. The rating characteristics to be used in a revised CER should elicit responses which are related to the more valid factors. For this purpose 14 rating characteristics were recommended. These were: Cooperativeness, Reliability, Job Performance, Drive, Development, Conduct, Initiative, Job Knowledge, Acceptability, Adaptability, Application, Leadership, Participation, and Responsibility. A random ordering of descriptive statements for each rating characteristic was proposed to counteract the tendency of raters to react to general impressions of ratees. The action was necessary since approximately 60 percent of the variance measured by the current CER was of this nature. (Author)

AD-636 406 **Field 5I**
CFSTI Prices: HC$3.00 MF$0.75
Illinois Univ., Urbana. Coordinated Science Lab.
THE USE OF PROGRAMMED LEARNING AND COMPUTER-BASED INSTRUCTION TECHNIQUES TO TEACH ELECTRICAL ENGINEERING NETWORK ANALYSIS.
by Roger L. Johnson. Jul 66, 85p Rept. no. R-297
Contracts DA-28-043-AMC-00073 (E), Nonr-3985 (08)
Proj. DA-20014501B31F

Descriptors: (*Programmed instruction, *Electrical engineering), Computers, Learning, Students, Effectiveness, Teaching methods, Training, Performance (Human), Circuits, Effectiveness, Teaching machines.

Identifiers: PLATO teaching system.

Two types of programmed instruction sequences (inquiry and tutorial) were used on the PLATO system to teach electrical network analysis (EE 322, University of Illinois). Two groups of students were selected to use each of the two types of instruction. Both of the instruction sequences were to provide the same performance objectives. The report describes the design and use of the instruction on the PLATO teaching system and summarizes the performance of the students with respect to the two methods of teaching. The study indicated that the desired performance objectives were obtained satisfactorily in both cases. Although in certain aspects the inquiry teaching program exhibited some advantages, a teaching program which could make available all of the facilities contained in the present programs would be more desirable. (Author)

AD-636 485 **Field 5I, 5J**
CFSTI Prices: HC$2.00 MF$0.50
Army Personnel Research Office, Washington, D. C.
PREDICTION OF REENLISTMENT AT END OF FIRST TERM OF ARMY SERVICE.
by William H. Helme, and Leo J. Kotula. May 66, 29p Technical research note 167
Proj. DA-2J024701A722

Descriptors: (*Recruiting, Army personnel), (*Army personnel, Psychometrics), (*Psychometrics, Factor analysis), Military psychology, Selection, Classification, Personality, Behavior, Attitudes, Motivation, Adjustment (Psychology), Leadership, Statistical analysis.

Identifiers: Prediction.

The identification and retention of potential high quality career enlisted men has been a matter of concern within all three Armed Services. In response to the Army, the New Classification Techniques Task undertook a three-year longitudinal research study to predict from characteristics of enlisted men, as measured at entry into the Army, reenlistment decision at the end of the first Regular Army term. The validation of a number of personal inventory measures developed to predict reenlistment action at the end of the first term of service is described in the Research Note. Responses to 631 questions in an attitude and background inventory administered to about 6000 Enlistees at entry into service, in the spring of 1958, were analyzed in relation to reenlistment action at the termination of three years' service. A general scale (23 items) developed on basis of results in a sample of 2600 first-term enlistees in a variety of MOS, yielded a coefficient of .29 in cross-validation. Construct scales reflecting different aspects of career motivation and scales empirically derived against a criterion of expressed career intentions were factor analyzed. Four interpretable factors were delineated: I-positive attitudes toward the service; II-high abilities on the Army Classification Battery, favorable background, good personality adjustment; III-mechanical ability and interest; IV-emphasis on career incentive and individual job goals. Factors I and IV were moderately related to reenlistment. A followup study is underway on the effects of service-connected factors on career motivation and changes in reenlistment intention. (Author)

AD-636 521 **Field 5I, 6G**
CFSTI Prices: HC$3.00 MF$0.75
Naval Personnel Program Support Activity, Washington, D. C. Personnel Research Lab.
A PRELIMINARY STUDY OF PERSONNEL AND TRAINING REQUIREMENTS FOR DEEP SUBMERGENCE RESCUE VEHICLES (DSRV).
by A. S. Propst Jr. Jun 66, 95p WRM-66-63
Proj. SQ46-15
Task 3

Descriptors: (*Submarine personnel, *Naval training), (*Sea rescue equipment, *Deep submergence), Maintenance personnel, Operators (Personnel), Submarine escape, Submarines.

A review of proposed equipments for the system indicates a requirement for highly skilled and experienced operator/maintenance personnel. In particular, the DSRV operator/maintenance crew will require highly skilled submarine qualified personnel. The report includes a description of system design and support requirements and contains estimates of personnel and training requirements for manning the system. (Author)

AD-636 539 **Field 5I, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
PROGRAM SKOOL: MANUAL FOR COMPUTER USE IN ENLISTED CLASSIFICATION, PROJECT COMPASS, PART III.
Technical bulletin.
by Bruce R. Wood, Carl C. Schuster, and John D. Martin. May 66, 39p STB-66-33
Proj. PF016050201
See also AD-632 741.

Descriptors: (*Naval personnel, Classification), (*Programming (Computers), Personnel managment), Selection, Computers, Training, Instruction manuals.

Identifiers: COMPASS project, SKOOL program.

The report describes the operation and use of Program SKOOL, the third part of Project COMPASS, a Computer Assisted Classification and Assignment System. Program SKOOL, a FORTRAN computer program, selects and assigns to a Navy recruit, a naval school, Naval Enlisted Classification Code, calendar week code, and a school location code based on recommendations received from an Enlisted Classification Interviewer. Program SKOOL then prints out all assignments and, if desired, punches assignment output cards. (Author)

AD-636 540 **Field 5I, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
PROGRAM LOCNEC: MANUAL FOR USE OF COMPUTER IN ENLISTED CLASSIFICATION PROJECT COMPASS, PART V.
Technical bulletin.
by Bruce R. Wood, Carl C. Schuster, and John D. Martin. May 66, 24p STB-66-32
Proj. PF016050201
See also AD-636 539.

Descriptors: (*Naval personnel, Classification), (*Programming (Computers), Personnel management), Selection, Computers, Training, Instruction manuals.

Identifiers: COMPASS project, LOCNEC program.

The report describes the operation and use of Program LOCNEC, the fifth part of Project COMPASS, a Computer Assisted Classification and Assignment System. Program LOCNEC, a FORTRAN computer program, assigns Naval Enlisted Classification Codes, school class convening dates, and school location codes to those recruits selected for the various naval schools. The logic of Program LOCNEC is incorporated into Program SKOOL, the third part of Project COMPASS. However, if Program OPERATE (Project Compass, Part VI) is used to make the school assignment, Program LOCNEC is then necessary, as a separate run, to complete the additional assignment above. (Author)

AD-636 555 **Field 5I, 15E**
CFSTI Prices: HC$1.00 MF$0.50
Research Analysis Corp., McLean, Va.
MINIMIZING REDUCTIONS IN READINESS CAUSED BY TIME-PHASED DECREASES IN AIRCRAFT OVERHAUL AND REPAIR ACTIVITIES.
by Jerome Bracken, and Kendall W. Simmons. 1966, 8p
Pub. in Naval Research Logistics Quarterly v13 n2 p159-65 Jun 1966.

Descriptors: (*Manpower studies, *Naval aviation), Personnel managment, Maintenance personnel, Naval aircraft, Operational readiness, Operations research, Logistics.

The Navy is often required to conduct personnel planning studies. A recent study on the assessment of effects of personnel reductions at the various aircraft Overhaul and Repair Activities (O and Rs) of the Bureau of Naval Weapons was carried out by one of the writers of the present paper. The methodology was systematic but relied on informal, judgmental decision procedures rather than on formal models incorporating optimization. Later study of the problem resulted in the approach described herein. The paper addresses this question: How can a personnel reduction in the Navy's aircraft O and Rs be distributed among activities with minimum reduction in readiness. A two-stage procedure involving linear programming models is developed. Solutions involve either extensions of aircraft overhaul cycles or a combination of such extensions with reductions in aircraft inventories. (Author)

AD-636 579 **Field 5I, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Human Resources Research Office, George Washington Univ., Alexandria, Va.
A REVIEW OF THE ANALYSIS OF VISUAL DISCRIMINATIONS IN HELICOPTER CONTROL.
by J. R. Thielges, and W. G. Matheny. Jun 66, 14p Professional paper-4-66
Contract DA 44-188-ARO-2
Prepared in cooperation with Life Sciences, Inc., Fort Worth, Tex. Prepared for presentation at the Southwestern Psychological Association, Arlington, Tex., 21-23 Apr 66.

Descriptors: (*Visual perception, *Pilots), Helicopters, Training devices, Rotary wings, Stability, Performance (Human).

The paper describes research performed under HumRRO Task ROTOR, Design of Rotary Wing Training Devices. An analysis was conducted of the necessary and sufficient cues for maintaining vehicle stability in pitch, roll, yaw, altitude, range, and latitude, and a model was developed which expresses the relationship between the cue sources and the information they provide about the vehicle stability in flight. The paper discusses the portion of the analysis which deals with the cue structure of the pilot's visual environment and the development of the model. (Author)

AD-636 606 **Field 5I, 5J**
CFSTI Prices: HC$6.00 MF$1.25
Lockheed-Georgia Co., Marietta.
PERCEPTUAL-PSYCHOMOTOR TESTS IN AIRCREW SELECTIONS: HISTORICAL REVIEW AND ADVANCED CONCEPTS.
by George E. Passey, and William A. McLaurin.
Jun 66, 245p ER-8077
Contract AF 41 (609)-2796
Proj. AF-7719
Task 771904
PRL-TR-66-4

Descriptors: (*Aviation personnel, Selection), (*Psychomotor tests, Aviation personnel), Perception (Psychology), Reviews.

Identifiers: Personnel screening tests.

The report reviews the literature reflecting the employment of perceptual-psychomotor tests for selection of aircrew members since World War II and provides behavioral concepts for consideration as possible future test development areas. The review considers the use of flight experience as well as perceptual-psychomotor screening devices and comments on the results of the programs in which such experience is intentionally used. The fundamental importance of criterion definition to development and validation of selection devices is discussed. Recent research is reviewed leading to the derivation of behavioral concepts recommended for consideration as principles on which new perceptual-psychomotor tests may be based. The merits of simple tests as opposed to complex tests in which numerous facets of performance are concurrently assessed are considered and the latter approach is recommended. (Author)

AD-636 607 **Field 5I, 5J**
CFSTI Prices: HC$4.00 MF$0.75
Personnel Research Lab. (6570th) Lackland AFB, Tex. Aerospace Medical Div.
ABSTRACTS OF PERSONNEL RESEARCH REPORTS: VI. 1954-1965.
by Jo Ann Elson. Dec 65, 107p PRL-TR-65-23
Projs. AF-6755, AF-7717
Projs. AF-7719, AF-7734. See also AD-610 800.

Descriptors: (*Air force personnel, Psychometrics), Abstracts, Classification, Selection, Personnel managment, Bibliographies.

Identifiers: Personnel screening tests.

The volume includes abstracts of the 374 technical reports issued by the Personnel Research Laboratory January 1954 through December 1965. They cover studies in selection, classification, and utilization of Air Force personnel; systematizing information flow in support of personnel planning; methods of describing, evaluating, and structuring Air Force jobs; and development of procedures for improving the quality of Air Force personnel. (Author)

AD-636 633 **Field 5I, 17C**
CFSTI Prices: HC$1.60 MF$0.50
Naval Medical Research Lab., New London, Conn.
THE RELATIVE BEARING AND TARGET ANGLE TRAINER.
Rept. no. 1 (final).
by William B. Brown. 6 Oct 45, 11p 77

Descriptors: (*Training devices, *Direction finding), (*Target angle, Training devices), Ships, Naval training.

The report deals with the design and use of a Relative Bearing and Target Angle Trainer. The device was successfully used in classroom instruction. The equipment is cheaply and easily made, and its use is recommended to all training stations where basic instruction in relative bearings and target angles is conducted. This trainer presents a bird's eye or aerial view of the models to the class and has, consequently, the shortcomings inherent in all such devices. It should be used in the initial stages of training only, during the explanation of the basic principles of relative bearing estimation, since drill in estimating relative bearings and target angles on any such bird's eye view trainer will not consistently transfer to skill in reporting the bearing or the target angle of a ship sighted. (Author)

AD-636 637 **Field 5I, 17C**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
THE TARGET ANGLE TRAINER.
Rept. no. 1 (final).
by William B. Brown. 1 Oct 45, 9p 76

Descriptors: (*Target angle, *Training devices), Ships, Design.

The target angle trainer represents a new type device. Results from its use are entirely satisfactory. It is therefore recommended that other activities concerned with lookout-recognition training consider the use of the trainer in their program. In order to assist activities desiring to use the target angle trainer, the report includes a description of its construction; a discussion of the methods of instruction recommended with its use; and a summary of its advantages in target angle training. (Author)

AD-636 776 **Field 5I, 16A**
CFSTI Prices: HC$1.00 MF$0.50
Human Resources Research Office, George Washington Univ., Alexandria, Va.
SOURCES OF VARIABILITY IN MISSILE UNIT EVALUATIONS.
Technical rept.
by Robert D. Baldwin, and Harry E. Anderson.
Jun 66, 25p TR-66-13
Contract DA-44-188-ARO-2
Proj. DA-2J024701A712-01

Descriptors: (*Guided missile personnel, Performance (Human)), (*Launching, Guided missiles), Analysis of variance, Reliability, Psychometrics.

The unit proficiency scores obtained during Missile Annual Service Practice firings during 1958 were analyzed. The objectives of the analyses were to identify the major factors affecting unit proficiency scores and to identify systematic sources of variance in the scores obtained. The analyses indicated (a) essentially no correlation existed between the Crew Performance and Firing Result Scores obtained, (b) differences in the total ASP Scores were primarily dependent upon differences in Firing Result Scores, and (c) differences in Firing Result Scores obtained were distributed in accordance with a random model. (Author)

AD-636 825 **Field 5I**
CFSTI Prices: HC$1.60 MF$0.50
College Entrance Examination Board, Princeton, N. J.
AN EVALUATION OF THE PERSONAL INVENTORY AND CERTAIN OTHER MEASURES IN THE PREDICTION OF SUBMARINE OFFICERS' EVALUATIONS OF ENLISTED MEN.
by G. A. Satter. 7 Sep 45, 20p 22
Contract OEMsr-705
Proj. N-106
OSRD-5557

Report on Research and Development of the Navy's Aptitude Testing Program.

Descriptors: (*Psychometrics, Effectiveness), (*Submarine personnel, Psychometrics), Officer personnel, Performance (Human), Aptitude tests.

The record cards of the Medical Research Laboratory at the New London Submarine Base supplied the test scores and school grades of some 1700 men who were later evaluated by submarine officers on a seven-trait graphic rating scale. The report attempts to evaluate the test scores and school grades as predictors of later submarine performance.

AD-636 827 **Field 5I, 5J**
CFSTI Prices: HC$3.00 MF$0.75
System Development Corp., Santa Monica, Calif.
THE DEVELOPMENT OF CRITERION-REFERENCED TESTS IN FOUR SKILLS FOR FIELD TESTING THREE APPROACHES TO TEACHING SPANISH IN ELEMENTARY SCHOOLS.
Technical memo.
by Gerald Newmark, Ralph Melaragno, and Harry Silberman. 22 Jul 66, 60p TM-3063

Descriptors: (*Teaching methods, *Language), (*Test construction (Psychology), Language), Students, Spain, Standards, Vocabulary.

Identifiers: Spanish language.

The document describes the tests and testing procedures developed for the California State Department of Education Spanish Research Project D-177, 'A Field Test of Three Approaches to Teaching Spanish in Elementary Schools.' System Development Corporation assisted the Department of Education in the planning and conduct of the study and had primary responsibility for developing the tests and conducting the final data analysis. The purpose of the project was to develop absolute assessment procedures as an aid to school districts in selecting a language course, improving instructional materials, modifying learning conditions and revising course objectives. A field test was conducted of three approaches to teaching Spanish to sixth-grade students (instruction by a qualified foreign language teacher, instruction by television, and programmed self-instruction). Tests were developed for each of the three language courses, 28 in all. The tests were unique to each language course and were designed to measure the extent to which each course achieved its own objectives, under specified conditions. No attempt was made to compare one course with another. (Author)

AD-636 840 **Field 5I, 9B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
RELATIONSHIPS AMONG PROGRAMMERS' BACKGROUND AND INTEREST CHARACTERISTICS: VOCATIONAL INTERESTS OF COMPUTER PROGRAMMERS.
Technical memo.
by Dallis K. Perry, and William M. Cannon. 26 Jul 66, 36p TM-2655/004/00
See also AD-628 207.

Descriptors: (*Programmers, *Attitudes), Programming (Computers), Manpower studies, Personnel management.

Relationships of background information on educational level, college major, programming experience, type of programming application, job responsibility, occupational satisfaction, and relative salary to scores on the Strong Vocational Interest Blank and additional background variables were analyzed for a national sample of computer programmers. Statistically significant relationships are reported showing consistent differences among business, scientific, software systems, and military systems programmers, with other relationships generally consistent with these differences. (Author)

AD-636 988 **Field 5I, 9B, 5J**
CFSTI Prices: HC$2.00 MF$0.50
University of Southern California, Los Angeles. Electronics Personnel Research Group.
COMPUTER PERSONNEL SELECTION AND CRITERION DEVELOPMENT: III. THE BASIC PROGRAMMING KNOWLEDGE TEST.
Technical rept.
by Joseph W. Rigney. Jun 66, 51p TR-49
Contract Nonr-228 (22)
Proj. NR-153-093
See also AD-432 020.

Descriptors: (*Computer personnel, Selection), (*Programming (Computers), Psychometrics), Achievement tests, Job analysis, Programming languages, Statistical analysis, Standards.

The Basic Programming Knowledge Test (BPKT), is intended to stand by itself as a criterion of programming proficiency. To achieve a close correspondence of test content to programming job requirements, subject-matter experts participated in the construction and review of the test questions. Test questions were selected that met the criteria of discrimination and appropriate difficulty, as indicated by the statistical analysis of results of a large preliminary testing. The final form of the test consists of 100 multiple-choice questions that are designed to be free of references to specific computers and languages now in use. Normative scores were developed for Navy computer groups. The relationships of the BPKT test scores to a number of vocational and educational variables are described. (Author)

AD-636 994 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
COMPARISON OF PERFORMANCE ON ANALOGOUS SIMULATED AND ACTUAL TROUBLESHOOTING TASKS.
Research memo.
by John H. Steinemann. Jul 66, 19p SRM-67-1
Proj. PF017030601

Descriptors: (*Performance (Human), Correlation techniques), (*Electronic technicians, Performance (Human)), Failure (Mechanics), Failure (Electronics), Simulation.

Identifiers: Troubleshooting.

The investigation compared the performance of a group of subjects assessed on a simulated troubleshooting task and on the identical actual troubleshooting task using real equipment. Subjects were 14 students in an experimental training program for Electronics Technicians. Analysis of results revealed that the simulated performance measure did not provide a valid estimate of performance proficiency on the actual task. Obtained negative inter-test correlations indicate that simulated test results would actually be misleading in terms of estimating actual performance scores. In addition to performance score discrepancies, there were observable differences in specific performance procedures and overall troubleshooting strategy attributable to the differences in test mode. The evidence strongly suggests caution in assuming that a simulated performance measure, even with considerable face validity, will provide a valid estimate of actual performance on a common task. (Author)

AD-637 117 **Field 5I**
CFSTI Prices: HC$8.60 MF$0.75
Human Resources Research Office, George Washington Univ., Alexandria, Va.
CONSULTING REPORT: THE TEXT OF AN ORIENTATION WORKSHOP IN AUTOMATED INSTRUCTION.
by William H. Melching, John A. Cox, Jesse C. Rupe, and Robert G. Smith Jr. Jul 62, 88p

Descriptors: (*Teaching machines, Symposia), (*Programmed instruction, Symposia), Automation, Training, Decision making, Instructors, Army training.

The materials were designed to accomplish the following objectives: (1) To provide a quite comprehensive description of what programmed instruction is, and of what is involved in the systematic development of programs. (2) To indicate some of the advantages of adopting programmed instruction and to point out some of the problems that can be foreseen. (3) To provide information that will be useful in making decisions about the applicability of this type of instruction for specific training situations. (4) To provide sufficient general knowledge in the area to assist training personnel in making realistic evaluations and judicious decisions regarding the growing number of proposals from outside agencies to program Army courses. (Author)

AD-636 397 **See Field 5J**

AD-636 638 **See Field 6N**

AD-636 835 **See Field 5J**

AD-636 962 **See Field 6G**

5J. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-456 174 **Field 5J**
CFSTI Price: HC$2.60
School of Aerospace Medicine, Brooks AFB, Tex.
HUMAN FACTORS ASPECTS OF A 30-DAY EXTENDED SURVIVABILITY TEST OF THE MINUTEMAN MISSILE.
Technical documentary rept.
by Bryce O. Hartman, Don E. Flinn, A. B. Edmunds, F. D. Brown, and J. E. Schubert. Oct 64, 27p SAM-TDR-64-62

Descriptors: (*Underground structures, Environmental tests), (*Guided missile personnel, Behavior), (*Launching sites, Guided missile personnel), Controlled atmospheres, Stress (Psychology), Sleep, Confined environments, Performance (Human), Physical fitness, Motor reactions, Reaction psychology, Perception (Psychology), Human engineering.

Two civilian subjects successfully completed 30 days of unbroken confinement in an underground Minuteman launch control center with an open-loop air supply. Logistic supplies were self-contained. During the test, they ate, slept, and performed duties similar to those that would be required of an operational crew in a postnuclear attack environment. Their performance score was high (99.75% level) with no critical errors. Morale throughout the test was excellent, with minimum of interpersonal friction. No physiologic or psychologic changes were observed which would compromise the integrity of the weapon system. Alterations in sleep patterns obtained were consistent with predictions based on work levels. (Author)

AD-636 397 **Field 5J, 5I**
CFSTI Prices: HC$2.00 MF$0.50
Naval Training Device Center, Port Washington, N. Y.
PHYSIOLOGICAL CORRELATES OF LEARNING AND OVERLEARNING.
by John L. Anderassi, and Patricia M. Whalen.
Jun 66, 30p NAVTRADEVCEN-1H-56
Proj. 7885-7

Descriptors: (*Learning, Psychophysiology), Galvanic skin response, Pulse rate, Electrophysiology, Relaxation (Physiology), Reaction (Psychology), Verbal behavior, Training.

Identifiers: Palmar skin conductance, Overlearning, Heart rate.

Two Experiments were conducted to investigate physiological activity associated with original learning and overlearning of verbal materials (nonsense syllables). In Experiment I, the physiological responses measured were heart rate (HR), palmar skin conductance (PSC), and galvanic skin response (GSR) during original learning, overlearning and new learning. In Experiment II, the same physiological responses were recorded but original learning was followed by two overlearning phases. The results showed that: (1) there were decreases in all of the physiological measures with overlearning, i.e., further practice with mastered materials; (2) there were increases in all of the measures with new learning; and (3) further decreases in physiological activity occurred with 'double overlearning' (practice with mastered materials after the overlearning phase). It was concluded that the drop in physiological activity which occurred with overlearning was due to an habituation of the physiological responses with decreased novelty in the learning materials and a reduction in apprehensiveness as the experiment progressed. (Author)

AD-636 478 **Field 5J**
CFSTI Prices: HC$3.00 MF$0.75
Human Resources Research Office, George Washington Univ., Alexandria, Va.
EXPERIMENTAL STUDIES OF SENSORY DEPRIVATION AND SOCIAL ISOLATION.
Technical rept.
by Thomas I. Myers, Donald B. Murphy, Seward Smith, and S. James Goffard. Jun 66, 79p TR-66-8
Contract DA-44-188-ARO-2
Proj. DA-2J014501B74B
Task 02

Descriptors: (*Sensory deprivation, Behavior), Confined environments, Reaction (Psychology), Stress (Psychology), Anxiety, Projective techniques, Psychometrics, Illusions, Propaganda, Confinement (Psychology).

To evaluate experimentally some of the psychological effects of sensory deprivation and social isolation, 176 randomly selected volunteers were placed in dark, soundproofed cubicles for four days, while an equal number of other randomly selected volunteers followed a normal routine. Psychological tests and measures were given both Cubicle and Control subjects before, during, and after isolation. Cubicle subjects reported the isolation experience to be unpleasant, boring, and stressful. One-third of them requested early release from the cubicles. In comparison with the Control subjects, Cubicle subjects were better on simple intellectual tasks and on auditory vigilance. They were worse on more complex intellectual tasks, and under some conditions, appeared to be more susceptible to influence. They more often sought meaningful stimulation but also showed some tendency to avoid stimulation. Sensory deprivation and social isolation do have psychological effects, but they are neither simple nor clear-cut. (Author)

AD-636 490 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Wilford Hall Hospital (Air Force), Lackland AFB, Tex. Aerospace Medical Lab. (Clinical).
INTERSCORER RELIABILITY AND THE KTSA.
Final rept., Apr 64-Oct 65.
by William R. Latham, Gerald S. Clack, and John C. Sparks. Jun 66, 10p AMLC-TR-66-1
Proj. AF-7756

Descriptors: (*Test construction (Psychology), Reliability), Scale, Decision making, Verbal behavior, Correlation techniques, Psychiatry.

Identifiers: Kahn Test of Symbol Arrangement.

Interpretive use of the Kahn Test of Symbol Arrangement (KTSA) requires that the scorer first make a series of decisions regarding the levels and quantities of abstraction associated with the verbal responses of a subject to the test objects. The as-

signed scoring categories were the subject of this study of interscorer reliability. The protocols of 181 patients were scored independently by eight experienced judges. Interscorer reliability yielded median phi coefficients for the nine scoring categories between .53 and .92. These coefficients were interpreted as corroborating the adequate interscorer reliability of the test. (Author)

AD-636 534 **Field 5J, 5K**
CFSTI Prices: HC$3.00 MF$0.50
Delaware Univ., Newark. Center for Research on Social Behavior.
VISUAL INTERACTION IN RELATION TO MACHIAVELLIANISM AND AN UNETHICAL ACT.
Technical rept.
by Ralph V. Exline, John Thibaut, Carole Brannan, and Peter Gumpert. 1 Aug 66, 58p TR-16
Contract Nonr-2285 (02)

Descriptors: (*Visual perception, *Social communication), Culture, Behavior.

The study is based on the proposition that communication between and among persons is carried on at several levels at once. The activity of the other's eyes is an extremely important source of the expressive information one gathers and sifts in the process of forming impressions of others.

AD-636 559 **Field 5J**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
INTERLINGUAL FACILITATION OF SHORT-TERM MEMORY.
by Paul A. Kolers. 2 Nov 64, 7p
Contract DA-36-039-AMC-03200 (E), Grant NSF-GP-2495
Grants NIH-MH-04737-04, NsG-496.

Descriptors: (*Recall, Probability), (*Memory, Vocabulary), Language, Frequency, Phonetics.

The probability of recalling a word from a long list of unconnected words increases monotomically with its frequency of occurrence. This facilitating effect of repetition upon recall is found to occur interlingually. The probability of recalling a word when it and its translation are presented n/2 times in each of a bilingual's two languages is approximately equal to its unilingual presentation n times. Since the words in the two languages are usually phonetically and visually distinct, it appears to be their conceptual identity that permits the facilitation. (Author)

AD-636 672 **Field 5J**
CFSTI Prices: HC$3.00 MF$0.75
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ELECTRIC SLEEP AND HYPNOSIS IN DERMATOLOGY (SELECTED PARTS).
by M. M. Zheltakov, Yu. K. Skripkin, and B. A. Somov. 13 May 66, 65p FTD-TT-65-1981
TT-66-61957
Unedited rough draft trans. of mono. Elektroson i Gipnoz v Dermatologii, Moscow 1963 p114-66.

Descriptors: (*Hypnosis, Therapy), Psychiatry, Sleep, Conditioned reflex, Surgery, Psychophysiology, Reviews, USSR.

For abstract, see T 66 18.

AD-636 835 **Field 5J, 5I**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
OBSERVATIONS ON EMERGENCY OPERATIONS IN A CIVIL DISORDER.
Professional paper.
by Marvin Adelson. 6 Jul 66, 11p SP-2522
Prepared for presentation at the Emergency Operations Symposium at SDC on 12 May 66.

Descriptors: (*Group dynamics, Police), (*Civil defense systems, *Police), Social sciences, Urban areas.

Identifiers: Riot control.

The Los Angeles riots provided an opportunity to learn about the problem of controlling civil disorder. Some observations that were made from a study of those riots, and some implications of those observations for future riot control are presented. (Author)

AD-636 841 **Field 5J**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
COMPUTATIONAL STUDIES OF PRESENTATION STRATEGIES FOR A MULTILEVEL MODEL OF LEARNING.
Technical memo.
by W. Karush, and R. E. Dear. 8 Jul 66, 32p TM-3035/000/00

Descriptors: (*Learning, *Optimization), Model theory, Conditioned reflex, Reaction (Psychology).

We consider a class of 'look-ahead' rules for generating stimulus presentation strategies in learning experiments, i.e., rules on (local) optimization over the next one, two, or more trials--given the subject's state of conditioning at the current trial. In previous studies using a two-level (single-element) model from the stimulus-sampling theory of learning, we proved that R (1) indeed generated only globally optimal strategies. In the present work we hypothesize a more general, multilevel learning model and put forth two conjectures concerning the rule R (h). We report on computational studies performed to test these conjectures. The computations did not refute the conjectures (although they led to some modification). The conjectures have not yielded to analytical treatment. The primary conjecture asserts that for an m-level model of learning the R (m-1) rule will generate a globally optimal strategy. Roughly, the second conjecture is the intuitive one that R (k) is at least as good as (h) for k h. (Author)

AD-636 997 **Field 5J**
CFSTI Prices: HC$5.00 MF$1.00
Illinois Univ., Urbana. Dept. of Psychology.
EFFECTS OF TASK CHARACTERISTICS ON GROUP PRODUCTS.
Technical rept.
by J. Richard Hackman. Jun 66, 163p TR-5
Contract AF 49 (638)-1291
Proj. AF-9778
Task 977802
AFOSR-66-0893

Descriptors: (*Group dynamics, Job analysis), Analysis of variance.

The most substantial determiner of product variance was task type. The task difficulty factor controlled a moderate proportion of the product variance, as did the interaction between task type and difficulty. Order of presentation was essentially unrelated to the product dimensions, either as a main effect or in interaction with other factors. All of the product dimensions were involved in significant relationships with one or more of the experimental factors. The percentage of variance associated with these relationships ranged from a high of 59 per cent (for action orientation) to a low of 15 per cent (for adequacy). Finally, product 'creativity' was successfully predicted from the product dimensions in multiple regression analyses, and different patterns of Beta weights were obtained for the product dimensions when predictions were made separately for the three types. (Author)

AD-637 015 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Indiana Univ., Bloomington.
OPERANT CONDITIONING OF SPONTANEOUS GSRs: TWO UNSUCCESSFUL ATTEMPTS.
Technical rept.
by John Boles, Joan Dionis, and Robert M. Stern. Jul 66, 13p TR-13
Contract Nonr-908 (15)
Prepared in cooperation with Pennsylvania Univ., University Park.

Descriptors: (*Galvanic skin response, *Conditioned reflex), Stimulation, Light.

Two attempts to operantly condition spontaneous GSRs are described. In the first, a dim light was used as reinforcement and in the second, nickels. In neither case was there any indication of conditioning. The procedure and results of these studies are discussed in reference to recent positive findings of other investigators working in this area. (Author)

AD-637 034 **Field 5J, 6P**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
NEUROPHYSIOLOGICAL EFFECTS OF EARLY SENSORY RESTRICTION.
by R. Melzack, and S. K. Burns. 19 May 65, 13p
Contract DA-36-039-AMC-03200 (E), Grant NSF-GP-2495
Grants PHS-MH-04737-05, NsG-496, PHS-MH-04235-03.

Descriptors: (*Sensory deprivation, Electrophysiology), (*Behavior, Sensory deprivation), Electroencephalography, Nervous system, Physiology, Central nervous system, Perception, Dogs.

Severe restriction of early sensory experience in dogs produces striking abnormalities in their behavior at maturity. There have been no studies, however, of the neurophysiological effects of early restriction. An exploratory study was therefore carried out with the purpose of examining the EEG as well as cortical and subcortical responses evoked by sensory stimulation in restricted dogs and their normally reared littermates. When the restricted dogs are first permitted to look at a novel environment through their open cage doors, the EEG shows a striking shift from predominantly low to high frequencies, and a shift back to low frequencies only after the door is closed. The responses evoked in the reticular fromation and cortex by clicks or light flashes are reduced in amplitude, and may be altered in wave form, during the presentation of the novel environment. The results lend support to the hypothesis that the behavioral effects of early sensory restriction are due to a failure to filter out irrelevant information on the basis of prior experience thereby producing excessive CNS arousal and a disruption of perceptual discrimination and adaptive response. (Author)

AD-636 317 **See Field 6S**
AD-636 328 **See Field 5I**
AD-636 433 **See Field 1B**
AD-636 485 **See Field 5I**
AD-636 579 **See Field 5I**
AD-636 606 **See Field 5I**
AD-636 607 **See Field 5I**
AD-636 617 **See Field 20F**
AD-636 632 **See Field 6P**
AD-636 671 **See Field 5D**
AD-636 753 **See Field 6P**
AD-636 795 **See Field 6S**
AD-636 800 **See Field 6P**
AD-636 827 **See Field 5I**
AD-636 913 **See Field 6C**

AD-636 988 See Field 5I

AD-637 030 See Field 6P

5K. SOCIOLOGY

AD-636 670 Field 5K
CFSTI Prices: HC$3.60 MF$0.50
Eliezer Kaplan School of Economics and Social Sciences, Hebrew Univ., Jerusalem (Israel).
ANALYSIS OF PROCESSES OF ROLE CHANGE; A PROPOSED CONCEPTUAL FRAMEWORK.
Final rept.
by S. N. Eisenstadt, D. Weintraub, and N. Toren.
Jan 63, 39p
Contract AF 61 (052)-480

Descriptors: (*Behavior, Analysis of variance), (*Sociometrics, Behavior), Israel.

The purpose of the paper is two-fold. First, to summarize and bring together some of the theoretical considerations which have come up in the course of the present research project in connection with problems of role structure, role behaviour and role crystallization. Second, to formulate a framework for the systematic analysis of processes of role-change, as suggested by and derived from these considerations.

AD-636 534 See Field 5J

6A. BIOCHEMISTRY

AD-636 333 Field 6A, 7E
CFSTI Prices: HC$1.00 MF$0.50
Weizmann Inst. of Science, Rehovoth (Israel). Biochemistry Section.
MECHANISM OF PHOTOPHOSPHORYLATION.
Final rept.
by Mordhay Avron. 30 Apr 66, 10p
Grant AF-EOAR-19-64
Proj. AF-9777
Task 97701
AFOSR-66-1462

Descriptors: (*Photosynthesis, Organic phosphorus compounds), (*Phosphorylation, Photochemistry), Chloroplasts, Adenosine phosphates, Tracer studies, Oxidation-reduction reactions, Enzymes, Antimetabolites, Algae, Israel.

Several aspects of the mechanism of photophosphorylation were investigated. The approaches included: structural degradation; determination of the path of the phosphate-oxygen; the relation of light induced ATPase-reactions to photophosphorylation; the localization of the site of ATP formation; studied with low-potential dyes; new inhibitors and uncouplers and their site of action; the isolation of a new enzyme, ADP-ribose phosphorylase from Euglena, and review of work in the field. (Author)

AD-636 335 Field 6A
CFSTI Prices: HC$6.60 MF$0.75
Sheffield Univ. (England). Dept. of Biochemistry.
REACTIONS OF CYTOCHROME OXIDASE WITH OXYGEN AND CARBON.
by Q. H. Gibson, and C. Greenwood. 1962, 61p
Grant AF-EOAR-61-2

Descriptors: (*Cytochrome oxidase, Reaction kinetics), (*Carbon monoxide, Reaction kinetics), (*Oxygen, Metabolism), (*Carbon, Metabolism), Spectroscopy, Dissociation, Iron, Venoms, Electronspin resonance, Photochemistry, Poisoning, Cyanides, Great Britain.

The reaction of Yonetani's (J. Biol. Chem v235 p845 1960) preparation of cytochrome oxidase with carbon monoxide is accurately second order with rate constant 80,000/M/sec at 20C and activation energy 6.4 kcal. The dissociation velocity constant of carbon monoxide is 0.023/sec at 20C pH 7.4. One third of the total iron reacts with carbon monoxide to form the carbon monoxide compound as determined both by spectrophotometry and by gasometric methods. The reaction of oxygen with reduced cytochrome oxidase is rapid and the course of the reaction is complex. When the reaction between reduced cytochrome oxidase and oxygen is followed at different wavelengths, the course of reaction changes. These changes are attributed to consecutive reactions between oxygen and reduced cytochrome a3 and between reduced cytochrome a3 and oxidized cytochrome a. The spectrophotometric changes at different wavelengths may be reproduced using the extinction coefficients given by Yonetani.

AD-636 336 Field 6A, 7E
Montana State Univ., Missoula. Dept. of Botany.
DIRECT EVIDENCE FOR THE SENSITIZED FORMATION OF A METASTABLE STATE OF BETA-CAROTENE.
by Meyer Chessin, Robert Livingston, and T. G. Truscott. 23 Dec 65, 7p
Contract AT (11-1)-794
AROD-2397:8
Prepared in cooperation with Lyons Labs., London (England).

Descriptors: (*Carotenoids, *Molecular energy levels), Absorption spectrum, Organic solvents, Polycyclic compounds, Chlorophylls, Reaction kinetics, Great Britain.

Identifiers: Carotenes.

Beta-carotene solutions in deoxygenated hexane do not exhibit detectable transient changes in their absorption spectra, when flash-illuminated in apparatus having a resolution time of about 0.00001 sec. However, solutions containing in addition to beta-carotene, substances such as anthracene, tetracene, benzanthracene or chlorophyll a, show a transient absorption with a maximum at 514 millimicrons, when so illuminated. The transient appears only when the actinic light is absorbed, partially or entirely, by the donor (i.e., anthracene, etc.); but not when it is absorbed only by the carotene. (Author)

AD-636 448 Field 6A
CFSTI Prices: HC$2.00 MF$0.50
Kyoto Univ. (Japan). Dept. of Medical Chemistry.
STUDIES ON THE METABOLISM OF NICOTINAMIDE ADENINE DINUCLEOTIDE.
Final rept. no. 6, 1 May 65-30 Apr 66.
by Osamu Hayaishi. May 66, 35p
Contract DA-92-557-FEC-37959
Proj. DA-2N014501B71D
Task 00-002FE
ARDG (FE)-J-178-6

Descriptors: (*Nucleotides, Biosynthesis), Metabolism, Tracer studies, Radioactive isotopes, Chromatographic analysis, Cells (Biology), Liver, Brain, Mice, In vivo analysis, Nicotinic acid, Pyridines, Carboxylic acids, Dosage, Japan.

Identifiers: Nicotinamide adenine dinucleotide.

In order to investigate the biosynthesis of NAD in vivo and to evaluate comparatively the quantitative significance of three precursors, nicotinic acid, nicotinamide and quinolinic acid, the radioactive substrates were injected directly into the portal vein of mice and the radioactive compounds in the liver were analyzed. When administered in small doses (78 mumoles per mouse), nicotinic acid was a much better precursor of NAD than nicotinamide. The incorporation of nicotinic acid-14C into NAD proceeded almost linearly up to 10 minutes, thereafter NAD-14C gradually decreasing to about one-half by 10 hours. Nicotinic acid ribonucleotide-14C and deamido-NAD-14C, the presumed intermediates in this conversion, were also detected during several minutes after the injection. In contract, nicotinamide-14C injected in this way was not utilized significantly for the de novo synthesis of NAD during the first hour after the injection. Quinolinic acid-14-C hardly penetrated into the liver cells. On the contrary, when administered in large doses (75 mumoles per mouse), nicotinamide was a much better precursor of liver NAD than nicotinic acid. With a large dose of nicotinamide-14C as substrate, the total radioactivity in the liver decreased rapidly during the first hour and than increased up to almost 8 hours after the injection. During the initial phase, the incorporation of 14C into NAD was almost insignificant but NAD-14C in the liver started to increase about one hour after the injection with the concomitant increase of the total radioactivity in the liver. (Author)

AD-636 644 Field 6A
CFSTI Prices: HC$1.10 MF$0.50
Sheffield Univ. (England). Dept. of Biochemistry.
STUDIES ON THE MECHANISM OF TPNH-CYTOCHROME c REDUCTASE.
by Bettie S. Siler Masters, H. Kamin, Q. H. Gibson, V. Massey, and C. H. Williams Jr. Sep 62, 2p
Grant AF-EOAR-61-2
Abstract of American Chemical Society Meetings, Atlantic City, N. J., Sep 1962. Prepared in cooperation with Duke Univ., Durham, N. C., Dept. of Biochemistry, and V. A. Hospital.

Descriptors: (*Oxidoreductases, Catalysis), Microsomes, Liver, Enzymes, Electron spin resonance, Spectroscopy, Great Britain.

An abstract is given of a report dealing with studies of the mechanism of TPNH-cytochrome-c reductase catalysis as obtained by electron-spin resonance, stopped-flow spectrophotometric and conventional spectrophotometric techniques.

AD-636 699 Field 6A, 6C
CFSTI Prices: HC$1.10 MF$0.50
Karolinska Institutet, Stockholm (Sweden).
RESEARCH ON CHROMAFFINE CELLS.
Final technical rept.
by J. Adams-Ray. 1966, 6p
Contract AF 61 (052)-450

Descriptors: (*Cyclostomata, Heart), (*Heart, Chemoreceptors), (*Chemoreceptors, Amines), Cells (Biology), Electron microscopy, Fluorescence, Chromatographic analysis, Epinephrine, Biological stains, Levarterenol, Histamine, Reserpine, Granules, Skin, Rabbits, Hamsters, Sweden.

For abstract, see T 66 18.

AD-636 707 Field 6A, 6M
Columbia Univ., New York. Coll. of Physicians and Surgeons.
AN ALTERATION OF THE DNA ISOLATED FROM ESCHERICHIA COLI TREATED WITH HYDROXYLAMINE.
by Herbert S. Rosenkranz, Howard S. Carr, and Samuel Rosenkranz. 24 Feb 66, 2p
Contract Nonr-266 (89), Grant PHS-CA-08374
Proj. NR-103 574

Descriptors: (*Desoxyribonucleic acids, Degradation), Escherichia coli, Metabolism, Mutations, Germicides, Chromosomes.

Identifiers: Hydroxyl amines.

For abstract, see T 66 18.

AD-636 734 Field 6A
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
A SIMPLIFIED TEST TUBE METHOD FOR THE ANALYSIS OF TOTAL CHOLESTEROL AND GLYCERIDES IN HUMAN SERUM.
by Dorothy F. Wease, Harry H. Malvin, and Eli S. Espinosa. Jun 66, 16p SAM-TR-66-53
Task 775505

Descriptors: (*Blood chemistry, Lipids), (*Cholesterol, Quantitative analysis), (*Lipids, Quantitative analysis), Blood analysis, Blood serum, Silicic acids, Phospholipids, Test methods.

A relatively simple and rapid procedure for the preferential extraction of total cholesterol and glycerides from serum is presented. Tecnics for quantitative assay of these lipids are included. This extraction-separation method eliminates the separate steps ordinarily required in the extraction of lipids and the removal of phospholipids from the extract. The clear extract is obtained without filtration or centrifugation. This technic is suitable for processing a large number of specimens per day and is also practical for use in a small clinical laboratory. (Author)

AD-636 779 **Field 6A, 6M**
Prairie Regional Lab., Saskatoon (Saskatchewan).
THE UTILIZATION OF TRYPTOPHAN IN THE BIOSYNTHESIS OF ECHINULIN.
by J. C. MacDonald, and G. P. Slater. 21 Sep 65, 9p NRC-8873

Descriptors: (*Tryptophan, Metabolism), (*Molds (Organisms), Metabolism), (*N-heterocyclic compounds, Biosynthesis), Ketones, Tracer studies, Molecular isomerism, Culture media, Canada.

Identifiers: Echinulin, Aspergillus.

Aspergillus amstelodami was grown on molasses medium to which was added DL-tryptophan, labeled with 14C in the 2 position of the indole ring or in the carboxyl, alpha, or methylene carbons of the alanine side chain. All of these labeled compounds were incorporated by the organism to a significant extent into echinulin. Carboxyl-14C-labeled DL-tryptophan was incorporated into echinulin without appreciable randomization of radioactivity. Methylene-14C-labeled L-tryptophan was used to a greater extent in the biosynthesis of echinulin than was the D-isomer. Both the D- and L-isomers were used more efficiently in the synthesis of fungal tryptophan than for the synthesis of echinulin. (Author)

AD-636 868 **Field 6A**
Army Biological Labs., Frederick, Md.
THE AMINO ACID COMPOSITION OF NORMAL HUMAN URINARY MUCOPROTEIN.
by Myles Maxfield, and David Stefanye. 5 Mar 62, 4p

Descriptors: (*Glycoproteins, *Urine), Amino acids, Quantitative analysis, Molecular weight, Aspartic acid, Glutomic acid, Carbohydrates, Nitrogen, Sulfur, Chromatographic analysis.

Normal human urinary mucoprotein, designated T and HE, was quantitatively analyzed for amino acids. From these results the minimal molecular weight of the mucoprotein is 28,100. The mucoprotein contains 6.45% hexosamine and 70.36% amino acids. More aspartic acid than glutamic acid is present. The known amino acid and carbohydrate residues account for almost all of the molecular weight and all of the nitrogen. Still unaccountable are three small chromatography peaks and 8 atoms of sulfur. (Author)

AD-636 869 **Field 6A, 6M**
Army Biological Labs., Frederick, Md.
EFFECTS OF METAL IONS ON THE OPTICAL SPECIFICITY OF GLUTAMINE SYNTHETASE AND GLUTAMYL TRANSFERASE OF BACILLUS LICHENIFORMIS.
by C. Gomez Leonard, R. D. Housewright, and Curtis B. Thorne. 21 Feb 62, 3p

Descriptors: (*Glutamine, Enzymes), (*Transferases, Glutamine), (*Bacillus, Enzymes), Ions, Nucleotides, Biosynthesis, Stereochemistry, Molecular rotation, Adenosine phosphates.

Identifiers: Bacillus licheniformis, Glutamine synthease, Glutamo hydroxamate, Glutamyl transferase.

Enzymes catalyzing transfer reactions of the gamma-glutamyl radical of glutamine and of glutamyl petides, but requiring added cofactors, were extracted from cells of bacillus licheniformis. Results are reported of studies on the role of nucleotides and metal ions on the synthesis of glutamine and in the synthesis of glutamohydroxamate from glutamate or from glutamine.

AD-637 026 **Field 6A**
CFSTI Prices: HC$5.60 MF$0.75
Sheffield Univ. (England).
ON THE NATURE OF COMPOUNDS PRESENT IN MIXTURES OF OXIDIZED AND REDUCED FLAVIN MONONUCLEOTIDES.
by Q. H. Gibson, V. Massey, and N. M. Atherton. 1962, 57p
Grant AF-EOAR-61-2

Descriptors: (*Anthoxanthin pigments, Nucleotides), (*Nucleotides, Chemical equilibrium), Spectroscopy, Fluorescence, Electron spin resonance, Absorption spectrum, Free radicals, Reduction (Chemistry), Complex compounds, Solutions, Quinones, Great Britain.

Identifiers: Flavin mononucleotides.

The composition of the equilibrium mixtures obtained on mixing known amounts of flavin mononucleotide (FMN) and reduced FMN (FMNH2) were studied by spectrophotometry, fluorimetry, and E.S.R. spectrometry. The major component of the mixtures containing more than 2mM total flavin is a species absorbing at 900 millimicrons which we regard as a charge transfer complex between FMNH2 and FMN. Comparison of the spectrophotometric and E.S.R. data show a close correlation between the extinction at 570 millimicron and the concentration of free radical. When the radical concentration is plotted against total percentage of reduced flavin at constant flavin concentration, a strongly asymmetric curve is obtained, peaking at about 70% reduction. Evidence is presented that this asymmetry is due to the presence of another radical species, a complex between the semiquinone and FMNH2. The formation of the complex between semiquinone and FMNH2 is inhibited in the presence of solutes such as caffeine and urea and in various organic solvents. (Author)

AD-637 087 **Field 6A**
Goettingen Univ. (West Germany). Inst. for Plant Physiology.
EFFECTS OF QUINONES AND OXYGEN IN THE ELECTRON TRANSPORT SYSTEM OF CHLOROPLASTS.
by Achim Trebst, Herbert Eck, and Sieglinde Wagner. 1963, 22p
Contract AF 61 (052)-716

Descriptors: (*Photosynthesis, *Chloroplasts), (*Quinones, Photosynthesis), (*Oxygen, Photosynthesis), Adenosine phosphates, Phosphorylation, Hydrogen peroxide, Oxidation, Ascorbic acid, Oximes, Electrons, West Germany.

Identifiers: Hydroquinol, Salicyclaldoximes.

Contents: Quinones as substrates for the Hill reaction; Quinones as cofactors of cyclic photophosphorylation; Quinones in H2O2 formation; The photooxidation of hydroquinones; Quinones in the photooxidation of ascorbic acid; The action of salicylaldoxime on photosynthetic reactions; Photooxidations in salicylaldoxime treated chloroplasts; p-Hydroxylation of salicylaldoxime by chloroplasts; Benzoquinones in the reactivation of petrolether extracted chloroplasts.

AD-637 088 **Field 6A**
Goettingen Univ. (West Germany). Inst. for Plant Physiology.
ZUM MECHANISMUS DES PHOTOSYNTHETISCHEN ELEKTRONENTRANSPORTES (The Mechanism of Photosynthetic Electron Transport in Isolated Chloroplasts).
by Achim Trebst, and Elfriede Pistorius. 30 Oct 64, 5p
Contract AF 61 (052)-716
Text in German; summary in English.

Descriptors: (*Photosynthesis, Electrons), (*Chloroplasts, Photosynthesis), Amines, Herbacides, Nucleotides, Adenosine phosphates, Metabolism, Phosphorylation, Reduction (Chemistry), West Germany.

Identifiers: Nicotinamide adenine dinucleotide phosphates, Tetramethyl phenylenediamines.

The behavior of 2,3,5,6-tetramethyl-p-phenylendiamine (DAD) in photosynthetic reactions of isolated chloroplast fragments was compared with that of N-tetramethyl-p-phenylendiamine (TMPD). Both reverse the DCMU-inhibition of photosynthetic NADP-reduction. The DAD-system (at high concentrations of DAD), is coupled to a stoichiometric ATP-formation, whereas the TMPD-system is not. This shows that p-phenylendiamines, depending on their constitution, may react with components of the electron transport chain of chloroplasts before or after the phosphorylation site, and locates the phosphorylation step of photosynthetic phosphorylation between two endogenous compounds in that part of the electron transport chain, which connects the two light reactions of photosynthesis. At lower concentrations of DAD the diminished NADP-reduction is no longer coupled to ATP-formation, indicating a second point of entry of electrons from DAD into the electron transport chain. DAD, furthermore, is a cofactor of cyclic photophosphorylation. It therefore behaves like DCPIP, but the rates of the DAD-system are higher. (Author)

AD-637 089 **Field 6A**
Goettingen Univ. (West Germany). Inst. for Plant Physiology.
UEBER DIE KONSTITUTION EINES WEITEREN PLASTOCHINONS UND SEINES DIMEREN AUS KASTANIENBLATTERN (The Constitution of an Additional Plastoquinone and its Dimers from Chestnut Leaves (Aesculus Hippocastanum).
by Von Herbert Eck, and Achim Trebst. 13 Mar 63, 7p
Contract AF 61 (052)-716
Text in German; summary in English.

Descriptors: (*Photosynthesis, Quinones), (*Chloroplasts, Quinones), Plants (Botany), Tissue extracts, Molecular structure, Spectroscopy, Ultraviolet radiation, West Germany.

Small amounts of plastoquinone-20 and the dimeres of plastoquinone-20 and plastoquinone-45 were isolated from chestnuttree leaves in addition to plastoquinone-45. Their structures were investigated mainly by spectroscopic means. Dimerisation of pure plastoquinone-45 was brought about by irradiation with UV light. (Author)

AD-637 090 **Field 6A**
Goettingen Univ. (West Germany). Inst. for Plant Physiology.
PHOTOSYNTHETISCHE REAKTIONEN IN UV-BESTRAHLTEN CHLOROPLASTEN (Photosynthetic Reactions in UV-Irradiated Chloroplast).
by Achim Trebst, and Elfriede Pistorius. 23 Jun 65, 5p
Contract AF 61 (052)-716
Text in German; summary in English.

Descriptors: (*Photosynthesis, *Ultraviolet radiation), (*Chloroplasts, Photosynthesis), Quinones, Adenosine phosphates, Phosphor-

ylation, Nucleotides, Reduction (Chemistry), Amines, Ascorbic acid, West Germany.

Photosynthetic reactions in isolated chloroplast fragments were investigated after they had been exposed to UV-light of 254 millimicrons, which is found to destroy the endogenous plastoquinone. The oxygen evolution is the most UV sensitive photosynthetic reaction. The ATP formation in the noncyclic and in the cyclic system with vitamin K5 as cofactor is less sensitive: the inactivation goes parallel to the destruction of the plastoquinone of the chloroplasts. Cyclic photophosphorylation with PMS as cofactor is diminished only after longer UV-irradiation. Photosynthetic reduction of NADP at the expense of an artificial electron donor system like DAD/ascorbate is not inactivated even after prolonged UV-exposure of the chloroplasts and therefore requires no plastoquinone. This indicates again, that the site of function of plastoquinone is close to the second light-reaction of photosynthesis. (Author)

N66-10594 **Field 6A**
CFSTI Prices: HC$1.00 MF$0.50
Turin Univ. (Italy). Medical Clinic.
BEHAVIOUR OF DNA SYNTHESIS IN DIFFERENT PHASES OF THE S-PERIOD IN CHROMOSOMES OF HUMAN ACUTE LEUKAEMIA.
by R. Bernardelli, F. Gavosto, L. Pegoraro, and A. Pileri. Aug 65, 10p
Contract EURATOM-016-62-1
EUR-2451.E
Prepared for presentation at Congr. of Intern. Soc. of Haematol (10th), Stockhom, 30 Aug-4 Sep 64.

Descriptors: *Oytology, *Chromosome, *Deoxyribonucleic acid (Dna), *Leukemia.

For abstract, see T 66 18.

N66-14246 **Field 6A**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Instrumentation Research Lab.
AN INVESTIGATION OF THE MASS SPECTRA OF TWENTY-TWO FREE AMINO ACIDS.
by N. Martin. 21 Sep 65, 65p IRL-103J
Grants NsG-81-60, PHS-NB-04270
NASA-CR-68768
Prepared in cooperation with Air Force, Grant AF-AFOSR-886-65.

Descriptors: *Biochemistry, *Mass spectrum, *Amino acid, *Spectrography.

N66-15836 **Field 6A**
CFSTI Prices: HC$1.00 MF$0.50
National Defense Research Organization, TNO, The Hague (Netherlands). Chemical Lab.
STEREOSPECIFICITY OF HYDROLYTIC ENZYMES IN THEIR REACTION WITH OPTICALLY ACTIVE ORGANOPHOSPHORUS COMPOUNDS. II. SYNTHESIS AND CHOLINESTERASE ACTIVITY OF THE ENANTIOMERS OF ISOPROPYL METHYLPHOSPHONOFLUORIDATE (SARIN).
by H. L. Boter. Sep 65, 13p TDCK-43718, Rept. no. 1965-12

Descriptors: *Fluorine compound, *Isomer, *Stereochemistry, *Organic phosphorus compound.

N66-15878 **Field 6A**
CFSTI Prices: HC$3.00 MF$0.50
International Lab. of Genetics and Biophysics, Naples (Italy).
REPORT OF ACTIVITIES OF THE INTERNATIONAL LABORATORY OF GENETICS AND BIOPHYSICS, JULY 1, 1963-JUNE 30, 1964.
Annual progress rept.
Nov 65, 52p EUR-2589.E
Contract EURATOM-012-61-12 BIAI

Descriptors: *Biophysics, *Genetics, *Virus, *Biochemistry, *Physiology.

N66-16046 **Field 6A**
CFSTI Prices: HC$4.00 MF$0.75
Beckman Instruments, Inc., Fullerton, Calif. Space Engineering Dept.
STUDY PROGRAM FOR BIOCHEMICAL MONITORING BY PAROTID SECRETION.
Final rept.
1964, 101p
Contract NAS2-2594
NASA-CR-69691

Descriptors: *Biochemistry, *Body fluid, *Secretion, *Parotid.

AD-459 313 **See Field 6P**

AD-636 605 **See Field 7D**

AD-636 697 **See Field 6M**

AD-636 702 **See Field 6P**

AD-636 768 **See Field 6M**

AD-636 812 **See Field 6M**

AD-636 850 **See Field 7D**

AD-636 866 **See Field 6M**

AD-636 909 **See Field 6R**

AD-637 085 **See Field 7E**

6B. BIOENGINEERING

N66-16283 **Field 6B**
CFSTI Prices: HC$4.00 MF$0.75
Naval School of Aviation Medicine, Pensacola, Fla.
BIOTELEMETRY OF THE TRIAXIAL BALLISTOCARDIOGRAM AND ELECTROCARDIOGRAM IN A WEIGHTLESS ENVIRONMENT.
by D. E. Beischer, and W. C. Hixson. 8 Sep 64, 116p
Contract NASA Order-R-20
NASA-CR-69828

Descriptors: *Ballistocardiogram, *Zero gravity, *Bioinstrumentation, *Electrocardiogram, *Telemetry.

6C. BIOLOGY

AD-636 326 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Karolinska Institutet, Stockholm (Sweden).
INTERNATIONAL SYMPOSIUM ON THE FUNCTIONAL ORGANIZATION OF THE COMPOUND EYE.
Scientific rept. (final).
by C. G. Bernhard. Oct 65, 14p
Grant AF-EOAR-73-65
Proj. AF-9777
Task 977701
AFOSR-66-1464
Prepared for presentation to Symposium, Stockholm 25-27 Oct 65.

Descriptors: (*Arthropods, Eye), (*Vision, Symposia), (*Visual perception, Arthropods), Biophysics, Photochemistry, Optics, Color vision, Chemoreceptors, Retina, Adaptation (Physiology), Sweden.

An international symposium on 'The Functional Organization of the Compound Eye' was organized and held in Stockholm 25-27 October 1965. About 90 scientists took part in the symposium including about 50 participants from foreign countries. The 34 papers delivered at the meeting are being published in a symposium volume. This report contains a general synopsis of the meeting and a copy of the program. (Author)

AD-636 337 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
University Coll., London (England). Dept. of Anatomy.
ANATOMICAL LOCALIZATION OF TARGET LEARNING AND MEMORY.
Final rept.
by J. Z. Young. 1966, 11p
Grant AF-EOAR-65-72
Proj. AF-9777
Task 977701
AFOSR-66-1479

Descriptors: (*Cephalopoda, Nervous system), (*Visual perception, Cephalopoda), (*Memory, Cephalopoda), Learning, Nerve fibers, Ganglia, Touch, Ingestion (Physiology), Electrophysiology, Electron microscopy, Degradation, Brain, Growth, Behavior, Great Britain.

Contents: Visual and tactile memories; Innervation of the viscera; Neuro-venous tissue; Conduction velocity; Food intake and growth; Feeding apparatus; Learning after delayed rewards; Electronmicroscopy of degenerating fibres and stellate ganglion; Command motor centres (peduncle lobe of octopus); Electronmicroscopy of tactile centres; Transmitters in brain of octopus.

AD-636 526 **Field 6C**
Illinois Univ., Urbana. Dept. of Entomology and Physiology.
d-TUBOCURARINE CHLORIDE: EFFECT ON INSECTS.
by Joseph R. Larsen, Donald M. Miller, and Toshio Yamamoto. 18 Feb 66, 4p
Grants AF-AFOSR-889-65, NSF-GB-2833

Descriptors: (*Insects, *Paralysis), (*Curare alkaloids, Insects), Dosage, Neuromuscular transmission, Skeletal muscle relaxants, Diptera.

Identifiers: Tubocurarine chloride, Calliphora erythrocephala.

Injection of d-tubocurarine chloride into certain insects produces complete flaccid paralysis. The site of injection is closely related to the region of primary paralysis. The effect depends on concentration, with distinct differences in the optimum concentrations for various species so far tested. A dose-response curve was prepared for Calliphora erythrocephala. (Author)

AD-636 577 **Field 6C**
Naval Ordnance Test Station, China Lake, Calif.
SWIMMING SPEED AND FIN CROSS SECTIONS OF PORPOISES.
by Thomas G. Lang, Kenneth S. Norris, and Karen Pryor. Aug 66, 15p NOTS-TP-4145
Tasks RRRE-04001/216-1/R009-01-01, R360-FR-106/216-1/R011-01-01
Prepared in cooperation with California Univ., Los Angeles, and Oceanic Inst., Waimanalo, Hawaii.

Descriptors: (*Cetacea, Hydrodynamics), Swimming, Fins, Morphology (Biology), Velocity, Analysis.

Identifiers: Porpoises.

Three papers on the hydrodynamic studies of porpoises are presented. Their titles are as follows: 'Hydrodynamic Analysis of Dolphin Fin Profiles,' 'Swimming Speed of a Pacific Bottlenose Porpoise,' and 'Hydrodynamic Performance of Porpoises (Stenella attenuata).' (Author)

AD-636 599 **Field 6C**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THIRTY YEARS OF CHINESE BOTANY IN RETROSPECT.
by Yung Lin. 23 May 66, 38p FTD-TT-65-211/1+TT-66-61915
Edited trans. of Sheng Wu Hsueh T'ung Pao (Chinese People's Republic) n2 p1-8 1964.

Descriptors: (*Plants (Botany), Scientific research), History, China, Reviews, Ecology, Fungi, Genetics.

For abstract, see T 66 18.

AD-636 691 Field 6C, 6M
CFSTI Prices: HC$3.00 MF$0.50
Hebrew Univ., Jerusalem (Israel). Dept. of Botany.
A STUDY OF THE PROBLEM OF LIGHT INTERMITTENCY AND PHOTOSYNTHETIC YIELDS IN MASS CULTURES OF ALGAE.
Technical rept.
by A. M. Mayer. 15 Sep 63, 55p
Contract AF 61 (052)-546

Descriptors: (*Algae, Growth), (*Photosynthesis, Algae), Light, Periodic variations, Carbon dioxide, Selection, Intensity, Electrolytes, Electrophoresis, Chlorella, Culture media, Oxygen, Polyvinyl alcohol, Ethylenedinitrilo tetraacetates, Chemical analysis, Israel.

The possibilities to improve the yields of a mass culture of algae were studied. The effect of the method of stirring and the resultant changes in light-dark intermittency in the cultures were examined. The method of supplying carbon dioxide to the culture was improved. It was shown that it is feasible to precipitate the algae from their medium using polyelectrolytes. It was found that suitability for mass culture can be readily screened by means of simple growth experiments together with photosynthetic measurements. No algal species more promising than Chlorella were found. The solubility of gases in the media was studied and on the strength of these measurements it was predicted and found that in a small closed tank carbon dioxide is absorbed almost quantitatively and oxygen released from the medium. Growth experiments disproved the claimed effect of polyvinyl alcohol on the growth and chlorophyll synthesis of the algae. A new method for determining ethylene diamine tetra-acetic acid is also described. (Author)

AD-636 872 Field 6C
Army Biological Labs., Frederick, Md.
THE ROLE OF FOWL AND THEIR EMBRYOS IN BIOLOGICAL RESEARCH.
by Bernard C. Easterday, and William R. Hinshaw. 1962, 10p
Presented at the Northeastern Conference on Avian Diseases (33rd), University of West Virginia, Morgantown, June 19-21, 1961.

Descriptors: (*Chickens, Embryos), (*Embryos, Medical research), Laboratory animals, Biological laboratories, Eggs.

For abstract, see T 66 18.

AD-636 885 Field 6C
Army Biological Labs., Frederick, Md.
MAINTENANCE OF MONKEYS EXPERIMENTALLY INFECTED WITH ORGANISMS PATHOGENIC FOR MAN.
by Joseph V. Jemski. 1962, 11p
Presented at the Annual Meeting of the Animal Care Panel (11th), October 28, 1960, St. Louis, Missouri.

Descriptors: (*Monkeys, Infectious diseases), (*Laboratory animals, Infections), (*Biological laboratories, Safety), Hazards, Laboratory equipment, Bacterial aerosols.

The many hazards associated in experimentation with pathogens infectious for man are greatly increased when animals are experimentally challenged with aerosols of such organisms. Particularly necessary is the prevention of transmission of the experimental infection to other animals, to the animal handler, and to the experimenter. Methods and equipment developed to successfully cope with these problems, especially in experiments with monkeys, are described and illustrated. (Author)

AD-636 905 Field 6C, 6M
Army Biological Labs., Frederick, Md.
AIR BORNE INFECTIVITY OF THE VARIOLA-VACCINIA GROUP OF POXVIRUSES FOR THE CYNOMOLGUS MONKEY, MACACA IRUS.
by Nicholas Hahon, and Malcolm H. McGavran.
1 Jun 61, 6p

Descriptors: (*Pox viruses, Diseases), (*Monkeys, Pox viruses), (*Immunity, Pox viruses), Infections, Airborne, Variola virus, Vaccinia virus, Vaccines, Fevers, Antigens + antibodies, Histology, Respiratory system.

Identifiers: Rabbitpox virus, Monkeypox virus, Alastrim vjirus, Cowpox virus.

Air-borne strains of poxviruses of the variola-vaccinia group (Variola, vaccinia, rabbitpox, alastrim, monkeypox, and cowpox) were infective for the cynomolgus monkey, Macaca irus. The pattern of disease consisted of a febrile reaction, distinctive constitutional signs of illness, variable mortalities and an immunological response in the form of neutralizing antibody. An exanthem was found only in animals exposed to variola or monkeypox viruses. The basic histopathological changes were ulcerative bronchiolitis, bronchitis and peribronchitis. In addition, fibrinous necrosis was noted in bronchial walls, peribronchial lymphoid tissues and bronchopulmonary lymph nodes. Evidence of immunity in surviving animals was indicated by the presence of neutralizing antibody and the absence of a dermal reaction following vaccination with smallpox vaccine. (Author)

AD-636 908 Field 6C, 2D
Army Biological Labs., Frederick, Md.
EFFECT OF VARIATIONS IN TEMPERATURE ON THE REACTION OF TEMPERATURE-SENSITIVE WHEAT VARIETIES TO WHEAT STEM RUST.
by K. R. Bromfield. 27 Mar 61, 5p

Descriptors: (*Wheat, Diseases), (*Rusts (Microorganisms), Infections), Fungui, Temperature, Life cycle, Tissues (Biology).

The temperature-sensitive wheat varieties Kenya N.B. 263 and Lerma 52 are resistant to wheat stem rust races, 17, 38, and 56 at 70F. Infected plants held as long as 18 days at 70F and then transferred to 77 or 85F did not retain the resistance. Sporulation typical for mycelium growing in susceptible tissue subsequently developed on the plants at the higher temperatures. Kenya N.B. 263 and Lerma 52 are susceptible to races 17,38, and 56 at 77F and 85F. Infected plants held as long as 18 days at 77F or 85F and then transferred to 70F did not retain the susceptibility. Macroscopic avidence of incompatibility between host and fungus became apparent within 2 or 3 days after transfer to the low temperature with the formation of a ring of necrotic tissue surrounding each of the previously susceptible-type pustules. The ring of dead tissue did not develop immediately adjacent to the zone of sporulation, but was separated from it by a band of green tissue. (Author)

AD-636 913 Field 6C, 6R, 5J, 9B K
CFSTI Prices: HC$1.00 MF$0.50
Honeywell, Inc., St. Paul, Minn. Systems and Research Div.
A COMPUTER SYSTEM FOR INTRASPECIES BIOLOGIC AND BEHAVIORAL VARIABILITY STUDIES.
Rept. for 1-28 Feb 66.
by Norman A. Sidley, David C. Brown, and Stirling P. Stackhouse. 13 Apr 66, 9p
Contract AF 41 (609)-2937
Task 775702
SAM-TR-66-60

Descriptors: (*Computers, Radiobiology), (*Behavior, Computers), (*Biology, Computers), Radiation effects, Sensitivity, Analysis of variance.

Identifiers: Radiosensitivity.

An analytical system is described for the computer analysis of variables pertinent to the study of intraspecies biologic and behavioral variability. This program can be used for the selection of appropriate variables, for predicting which variables should be selected for future study on radiation effects, and for statistical significance testing. (Author)

AD-637 028 Field 6C
CFSTI Prices: HC$1.10 MF$0.50
Cambridge Univ. (England). Dept. of Zoology.
STUDY OF THE DEVELOPMENT AND INTEGRATION OF NEST-BUILDING SKILLS IN CANARIES; THE EFFECT OF ABLATION OF THE FOREBRAIN OF AVIAN BEHAVIOUR; CURIOSITY AND FEAR RESPONSES TO STRANGE STIMULI.
Technical rept.
by R. A. Hinde. 12 Jan 63, 5p
Grant AF-EOAR-62-44

Descriptors: (*Birds, *Behavior), Fear, Skin, Reproductive system, Hormones, Sensitivity.

Identifiers: Canaries, Nests.

Attention was concentrated on the role of peripheral factors, and in particular the development of the brood-patch, in the integration of reproductive behaviour. Brood-patch development has been induced by exogenous hormones, and it was shown that there are changes in skin sensitivity as the brood-patch develops. The histological basis of this change in skin sensitivity is being studied. Other work is concerned with the mobbing response given by chaffinches to predators, which involves an approach/avoidance conflict. A detailed analysis is being made of the relations between the elements of this response. (Author)

AD-637 083 Field 6C
Hebrew Univ., Jerusalem (Israel). Dept. of Botany.
PROBLEMS OF DESIGN AND ECOLOGICAL CONSIDERATIONS IN MASS CULTURE OF ALGAE.
by A. M. Mayer, U. Zuri, Y. Shain, and H. Ginzburg. 7 Dec 63, 21p
Contract AF 61 (052)-546

Descriptors: (*Chlorella, Electrophoresis), (*Algae, *Culture media), Containers, Design, Ecology, Carbon Dioxide, Selection, Light, Contamination, Israel.

A 2000 l. 1m. deep mass culture of algae was operated with continuous stirring, as an open system. The system behaved as an ecological unit selecting the most favored species. The ecological conditions could be modified by stirring speed and pattern in the tank. Methods for improving yields and utilization of CO2 are described. Assessment of algal species for suitability in mass cultures is discussed. Yields obtained were 13 g. dry matter/sq. m. illuminated area/day. (Author)

N66-11774 Field 6C
CFSTI Prices: HC$4.00 MF$0.75
Research Lab. of Electronics, Massachusetts Inst. of Tech., Cambridge.
THE EVOKED VOCAL RESPONSE OF THE BULLFROG- A STUDY OF COMMUNICATION BY SOUND.
by R. R. Capranica. 1965, 115p Monograph no. 33
Grants NsG-496, NSF GP-2495
NASA-CR-67962
Prepared in cooperation with Dept. of Army and Nat'l. Inst. of Health.

Descriptors: *Communication, *Frog, *Sound.

For abstract, see T 66 18.

N66-12904 Field 6C
CFSTI Prices: HC$1.00 MF$0.50
Dominion Physical Lab., Lower Hutt (New Zealand).
THE PHOTOCONDUCTIVITY OF CHLOROPHYLL MONOLAYERS.
by R. L. Jones, and K. J. Mc Cree. 15 Jan 63, 12p R-300

Descriptors: *Chlorophyll, *Photoconductivity.

N66-16712 Field 6C
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
THE RESISTIVITY OF MICROORGANISMS TO THERMAL INACTIVATION BY DRY HEAT.
by G. J. Silverman. 21 Jan 66, 34p
Grant NsG-691
NASA-CR-70029

Descriptors: *Heat resistance, *Spore, *Microbiology, *Thermal shock.

N66-17778 Field 6C
CFSTI Price: MF$1.00
National Aeronautics and Space Administration, Washington, D. C.
SIGNIFICANT ACHIEVEMENTS IN SPACE BIOSCIENCE, 1958-1964.
1966, 142p NASA-SP-92
Available from Superintendent of Documents, GPO, Washington, D.C. 20402 HC$0.55.

Descriptors: *Biology (GEN), *Space science, *Aerospace medicine, *Bioinstrumentation, *Space flight.

AD-636 412 See Field 8A

AD-636 426 See Field 6F

AD-636 491 See Field 8A

AD-636 699 See Field 6A

AD-636 765 See Field 6E

AD-636 823 See Field 6M

AD-636 863 See Field 2A

AD-636 903 See Field 6T

AD-637 082 See Field 7C

6D. BIONICS

AD-636 313 Field 6D, 9B
CFSTI Prices: HC$1.60 MF$0.50
System Research, Ltd., Richmond (England).
A CYBERNETIC MODEL OF HUMAN DATA PROCESSING.
by Gordon Pask. 1964, 16p
Contracts AF 61 (052)-640, AF 61 (052)-402
Prepared for presentation at the Proceedings of the International Union of Physiological Sciences. International Congress (22nd) in Leiden, 1962 p218-33.

Descriptors: (*Cybernetics, Behavior), (*Bionics, Behavior), Humans, Data processing systems, Learning, Man-machine systems, Great Britain.

For abstract, see T 66 18.

AD-636 322 Field 6D, 9B
CFSTI Prices: HC$4.00 MF$1.00
Michigan State Univ., East Lansing. Div of Engineering Research.
AN ITERATED NET MODEL OF THE VERTEBRATE COMMAND AND CONTROL SYSTEM.
Final scientific rept., 1 Mar 65-28 Feb 66.
by W. L. Kilmer, W. S. McCulloch, J. Blum, E. Craighill, and D. Peterson.1 Mar 66, 136p
Contract AF 19 (628)-5076
Proj. AF-4641
Task 464105
AFCRL-66-356

Descriptors: (*Bionics, Central nervous system), (*Central nervous system, Mathematical models), Embryology, Vertebrates, Physiology, Cybernetics, Models (Simulations), Behavior, Iterative methods, Flow charting, Analog-digital computers, Computer logic.

An eigenstate approach to the problem of stable biosynthetic mode points in cells is considered. This problem is cybernetically dual to the reticular formation one of passing from stable mode point to stable mode point under input provocation. The report also discusses a theory of the reticular formation. Throughout the life of the vertebrates, the core of the central nervous system, sometimes called the reticular formation, has retained the power to commit the whole animal to one mode of behavior rather than another. Its anatomy, or wiring diagram, is fairly well known, but to date no theory ofits circuit action has been proposed that could possibly account for its known performance. Its basic structure is that of a string of similar modules, wide but shallow in computation everywhere, and connected not merely from module to adjacent module, but by long jumpers between distant modules. Analysis of its circuit actions heretofore proposed in terms of finite automata or coupled nonlinear oscillators has failed. Nonlinear, probabilistic hybrid computers are proposed as proper modules, and a behavioral simulation of an anastomatically-coupled linear array of 12 such computers is described. The model contains about 2200 wires, yet still behaves as an integral unit, rolling over from stable mode to stable mode according to abductive logical principles, and as directed by its succession of input 60-tuples. (Author)

AD-636 400 Field 6D, 12A
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Dept. of Statistics.
SOME STATISTICAL ASPECTS OF CHARACTER RECOGNITION.
Technical rept.
by James L. Dolby. 31 May 66, 73p TR-115
Contract Nonr-225 (52)
Proj. NR-342-022

Descriptors: (*Character recognition, Statistical analysis), Optical scanning, Pattern recognition, Decision theory.

The character recognition problem is considered as a generalization of the discrimination problem. Two issues that are of trivial importance in the two category problem become central to the n-category problem. Not all of the available information is relevant to each of the discriminations that have to be made. A few of the discriminations are much more difficult than all of the others. The analysis consists mainly of studying which character pairs are difficult to separate. After dealing with these it is relatively easy and expedient to separate the others by a few functions of the observations which are less than optimal for a particular pairwise discrimination but which serve to make many pairwise discriminations adequately. Assuming a particular physical mechanism and a specific character set of 36 characters, decisions are made on the choice of blocksize in the scanning area, the procedure for positioning characters within the scanning area, the choice of twelve linear functions of the blackness in a block for each of the blocks in terms of which the discriminations are to be made, and the robustness of the system to variations in character position. (Author)

AD-637 111 Field 6D, 9B
CFSTI Prices: HC$4.00 MF$0.75
Foreign Technology Div., Wright-Patterson AFB, Ohio.
TRAINING PATTERN-RECOGNITION MACHINES.
by A. G. Arkadev, and E. M. Braverman. 26 Mar 66, 117p FTD-TT-65-1699
TT-66-62054
Unedited rough draft trans. of mono. Obuchenie Mashiny Raspoznavaniyu Obrazov, Moskva 1964, 110p.

Descriptors: (*Pattern recognition, *Learning machines), (*Artificial intelligence, Learning machines), Bionics, USSR.

For abstract, see T 66 18.

AD-636 314 See Field 9B

AD-636 480 See Field 5H

6E. CLINICAL MEDICINE

AD-636 444 Field 6E, 6M
CFSTI Prices: HC$2.00 MF$0.50
Tokyo Municipal Komagome Hospital (Japan).
THE STUDY ON THE PATHOGENICITY OF BACILLARY DYSENTERY.
Final rept. 4 Aug 64-3 Aug 65
by Kazumine Kobari. 3 Aug 65, 30p
Grant DA-CRD-AG-S92-544-64-G22
Proj. DA-3A014501B71Q
Task 00-018-FE
ARDG (FE)-J-212-4
Available in black and white after original copies are exhausted.

Descriptors: (*Dysentery, Pathology), Medical examination, Edema, Histology, Intestines, Membranes (Biology), Mucus, Biopsy, Infections, Etiology, Diagnosis, Shigella, Fluorescent antibody techniques, Japan.

Edema and hyperemia were chosen as the two main sigmoidoscopical findings of the sigmoid and rectum on patients with bacillary dysentry. According to the combination of these two findings, 1293 cases with bacillary dysentery were classified into four groups. The corrleation of the sigmoidoscopical findings with the clinical symptoms was investigated on 244 patients with bacillary dysentery. An attitude of goblet cells was chosen as an indicator of the stage and severity of the disease. Its correlation with the stage of illness and other important histological findings was mentioned. The process of the disease was analyzed in the clinical standpoint and at the same time it was considered in reference with the correlation of the macroscopical and histological findings of the intestinal mucous membrane to the clinical signs. The pathogenesis of bacillary dysentery was discussed from the results of the above-mentioned observations and their relationship. (Author)

AD-636 476 Field 6E, 6M, 2E
CFSTI Prices: HC$1.00 MF$0.50
Arctic Aeromedical Lab., Fort Wainwright, Alaska.
HUMAN ENTERIC PATHOGENS IN DOGS IN CENTRAL ALASKA: PART II.
Rept. for Jul 65-Mar 66.
by Clifford E. Butler, and Charles E. Busbee. May 66, 14p AAL-TR-66-4
Proj. AF-8241
Task 824101

Descriptors: (*Enterobacteriaceae, Dogs), Disease vectors, Salmonella, Alaska, Urban areas, Public health, Veteriniary medicine, Etiology.

A second year's survey of Salmonella and related enteric pathogens in dogs in Fairbanks, Alaska, shows that house pets within the city have a much higher incidence rate than do other groups of dogs in the area. Nine different species of Salmonella and four related Enterobacteriaceae were recovered. During the two years of study, 20 species of Salmonella have been recovered. Consideration of factors that constitute a dog's environment indi-

cates that acquisition and dissemination of these pathogens are directly related to the animal's freedom of movement, particularly its access to refuse and garbage. (Author)

AD-636 477 **Field 6E, 6M, 6O**
CFSTI Prices: HC$1.00 MF$0.50
Arctic Aeromedical Lab., Fort Wainwright, Alaska.
SALMONELLA ANATUM: REPORT OF AN ALASKAN OUTBREAK.
Rept. for 24 Sep 64-1 Mar 65.
by Clifford E. Butler, Wayne L. Miller, Charles T. Marrow, and Raymond D. Evans. May 66, 15p
AAL-TR-66-5
Proj. AF-8241
Task 824101

Descriptors: (*Salmonella, Alaska), (*Digestive system diseases, Alaska), Etiology, Virus diseases, Gastrointestinal system, Diseases, Biological contamination, Food dispensing, Food poisoning, Chemotherapeutic agents, Public health.

Identifiers: Ampicillin.

In the central part of Alaska, gastroenteritis is a perennial problem, with the incidence rate reaching almost epidemic proportions in the early summer and early autumn. The causative agents appear to be both viral and bacterial. In 1964 during the autumn epidemic, Salmonella anatum invaded the Univeristy of Alaska campus along with a probable viral infection. Approximately 300 students developed symptoms of gastroenteritis during this outbreak but only a very small percentage became acutely ill. Thirty-five students and eight food handlers were found to be infected with Salmonella anatum. A therapeutic history of the outbreak showed (ampicillin) Polycillin to be very effective in eradicating the organisms from the patients. (Author)

AD-636 509 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn.
AEROTITIS MEDIA IN SUBMARINE RECRUITS.
Research rept. (Interim).
by Howard J. Alfandre. 29 May 65, 25p Rept. no. 450
NAVMED-MR005.14-3100-1.05

Descriptors: (*Military medicine, Submarine personnel), (*Ear, Pathology), Oxygen, Pressure, Toxicity, Hearing, Auditory acuity, Respiratory diseases, Thresholds (Physiology), Sound, Training.

In order to evaluate the predisposing factors, the results, and possible sequelae of aerotitis media as encountered among submarine recruits during their physical qualification for submarine training, 432 such candidates were studied as they underwent pressurization in a dry-cylinder tank. Among these men, 156, or 36.2 per cent, developed aerotitis following pressurization. Upper-respiratory infection was shown to predispose a man to development of aerotitis; also predisposing were the inability to insufflate the middle ear, and the presence of nasal allergies. The presence of adenoidal tissue and/or dental malocclusion did not appear directly related. Recommendations are made concerning the medical handling of pressurized groups, and methods of reducing the effects of the noise that accompanies the pressurization process. (Author)

AD-636 525 **Field 6E**
California Univ., San Francisco. Medical Center.
OCCULT NONTROPICAL SPRUE AND ASSOCIATED ATROPHIC GASTRITIS SIMULATING ADDISONIAN PERNICIOUS ANEMIA, WITH SPECIAL REFERENCE TO IMMUNOLOGIC DIAGNOSTIC STUDIES.
by Paul Brown, Kirk D. Wuepper, and H. H. Fudenberg. 1966, 6p
Grant PHS-HE-05997

Descriptors: (*Vitamin B complex, Deficiency diseases), (*Deficiency diseases, Diagnosis), Medical examination, Digestive system diseases, Anemias, Immunology, Test methods, Antigens + antibodies, Etiology, Folic acid, Hematology, Biopsy, Secretion, Genetics.

The unusual coincidence of vitamin B12 and folic acid deficiency, associated with both nontropical sprue and atrophic gastritis, is reported in an elderly Danish man. Although history, physical examination, and hematological studies suggested a diagnosis of addisonian pernicious anemia, the failure to find antibodies to parietal cell antigen led to further investigations, including gastric and jejunal biopsies and estimation of intrinsic factor secretion, which established the primary disease as nontropical sprue. The value of immunological methods in distinguishing addisonian pernicious anemia due to a genetically determined deficiency of intrinsic factor from other forms of megaloblastic anemia is emphasized. (Author)

AD-636 618 **Field 6E, 6M**
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
PROBLEMS OF THE MAJOR INFECTIOUS DISEASES.
26 Mar 66, 236p FTD-TT-65-1594
TT-66-61929
Problemy Vazhneishikh Infektsionnykh Zabolevanii, trans. of Nauchnye Trudy Uchenykh i Prakticheskikh Vrachei Uzbekistana. Sbornik (USSR) n3 p1-194 1962.

Descriptors: (*Infectious diseases, Medical research), Pathology, Infectious hepatitis virus, Diseases, Blood chemistry, Pregnancy, Birth, Cobalt, Copper, Iron, Manganese, Vitamin B complex, Adrenocorticotropic hormone, Bile pigments, Children, Metabolism, Salmonella, Diagnosis, Therapy, Blood transfusions, Dysentery, USSR.

The results of studies in the field of infectious pathology are presented. New data are given on such infectious diseases as infectious hepatitis, typhoid and paratyphoid diseases and dysentery. New data are also given on the metabolism of certain trace elements (manganese, cobalt and copper) and vitamins, on the diagnosis and treatment of infectious hepatites. In the section on typhoid and paratyphoid diseases, rather new material is presented on the typhoid and paratyphoid diseases, rather new material is presented on the metabolism of copper, cobalt and iron, methods of early laboratory diagnosis and treatment of the patients. In the papers on dysentery methods of using specific phages in the diagnosis of bacterial dysentery are described.

AD-636 634 **Field 6E, 6P**
CFSTI Prices: HC$3.60 MF$0.50
Naval Medical Research Lab., New London, Conn.
STUDIES ON THE COMPARATIVE EFFICIENCY OF THE FREE VOICE AND THE PURE TONE AUDIOMETER FOR ROUTINE TESTING OF AUDITORY ACUITY.
Interim rept. no. 1.
by J. D. Harris. 8 Oct 45, 34p 78
NAVMED-X-487

Descriptors: (*Audiometry, Effectiveness), (*Auditory acuity, Medical examination), Speech, Medical equipment, Functional analysis, Sound, Tests.

A reference paper on auditory acuity testing is presented, designed to help the beginning worker reach a decision as to which test or tests he should institute, and to provide a body of data against which the experienced worker may check his own procedures. Data is summarized from this and other laboratories bearing on the relative usability of the free voice and the pure tone audiometer as tests of auditory acuity. It is found the consensus of most studios that a careful voice test and pure tone audiometry through the speech range (512-2048 c.p.s.) are intimately connected and measure almost the same auditory function. A comparison of six studios reveals the relationship between the two tests to be a straight-line function. Statements cited to the effect that speech and audiometry are not related are definitely contraverted. (Author)

AD-636 645 **Field 6E**
CFSTI Prices: HC$1.60 MF$0.50
Nara Medical Coll., Kashihara City (Japan).
EXPERIMENTAL SURGERY ON RESUSCITATION AND REUNION OF AMPUTATED OR NEARLY AMPUTATED LEG.
Final rept. no. 1, 1 Nov 60-31 Oct 61.
by Yutaka Onji. 31 Oct 61, 16p
Contract DA-92-557-FEC-34352

Descriptors: (*Amputation stumps, Surgery), Legs, Surgical techniques, Blood circulation, Oxygen consumption, Glucose, Metabolism, Blood transfusions, Blood vessels, Military medicine, Dogs, Japan.

Experimental surgery was done on dogs to unite the completely amputated leg after artificial perfusion by pump oxygenator. The pump oxygenator was used to resuscitate the amputated leg to near physiological condition and the femur, sciatic nerve, femoral nerve, muscles, femoral artery, femoral vein and skin were sutured back. Of 39 surgeries performed in a year 6 successful reunions were obtained. During the artificial perfusion, oxygen consumption and glucose metabolism of amputated leg were studied. It was found from the experiments that perfusion of an amputated leg by the same blood is preferably to be limited to two hours. (Author)

AD-636 713 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
A MECHANICAL HAND WITH AUTOMATIC PROPORTIONAL CONTROL OF PREHENSION.
Technical rept.
by Lloyd L. Salisbury, and Albert B. Colman. May 66, 17p TR-6611
Proj. DA-3A13001A91C-01-012

Descriptors: (*Prosthetics, Hands), Artificial limbs, Automatic, Control systems, Operation, Amputees.

A new approach to the control of prehension is presented which provides the upper extremity amputee with automatic control by detecting the slippage of objects grasped. The requirements for control of a functional prosthesis are presented and various control methods analyzed with respect to these requirements. (Author)

AD-636 714 **Field 6E, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Medical Center, Washington, D. C.
INSTRUCTION MANUAL FOR PREPARING A POROUS EPOXY PTB SOCKET WITH SOFT DISTAL END.
Technical rept.
by Robert E. Plumb, James T. Hill, and Henry Mouhot. May 66, 19p TR-6609
Proj. DA-3A025601A821-01-095

Descriptors: (*Artificial limbs, Prosthetics), (*Prosthetics, Epoxy plastics), Joints (Physiology), Lamenated plastics, Porosity.

A simplified procedure for preparing PTB sockets is described. Preimpregnation of the stockinet and evaporation of solvent prior to lay-up results in a stronger, more porous socket. (Author)

AD-636 725 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
TECHNIC FOR REMOVAL OF WHOLE RETINAS.
Rept. for 1962-1966.
by Jesse Vasys. Jul 66, 13p SAM-TR-66-67
Task 583004

Descriptors: (*Retina, *Histological techniques), Histology, Ophthalmology, Thermal radiation, Burns, Eye, Pathology, Biological stains.

A method of dissection that provides undamaged, intact retinas is described. Whole eyes are soaked successively in 10% buffered formaldehyde, distilled water, 60% alcohol, and distilled water. The eye globe is divided into two sections and the whole retina is removed by a gravity flow technic. The retina is then clover-leafed, stained, and mounted on a glass slide. (Author)

AD-636 758 **Field 6E**
CFSTI Prices: HC$7.60 MF$0.75
Royal Dental Coll., Copenhagen (Denmark). Dept. of Oral Pathology.
BIBLIOGRAPHY OF EUROPEAN LITERATURE ON PERIODONTAL DISEASES 1950-1959.
by Jens J. Pindborg. 1962, 73p
Contract AF 61 (052)-532
See also AD-636 759.

Descriptors: (*Teeth, Diseases), (*Dentistry, Bibliographies), Mouth, Pathology, Diagnosis, Therapy, Surgery, Prosthetics, Biochemistry.

For abstract, see T 66 18.

AD-636 759 **Field 6E**
CFSTI Prices: HC$7.60 MF$0.75
Royal Dental Coll., Copenhagen (Denmark). Dept. of Oral Pathology.
BIBLIOGRAPHY OF EUROPEAN LITERATURE ON PERIODONTAL DISEASES 1950-1959. PART III. ARRANGED ACCORDING TO SUBJECT.
by Jens J. Pindborg. 1962, 80p
Contract AF 61 (052)-532

Descriptors: (*Teeth, Diseases), (*Denistry, Bibliographies), Epidemiology, Pathology, Military medicine, Diagnosis, Children, Bacteria, Histology, Etiology, Nutrition, Hormones, Therapy, Surgery, Vitamin E, Tissue extracts, Reviews, Denmark, Europe.

Contents: General Surveys on Peridontal Diseases; History; Terminology and Classification; Epidemiology; Anatomy; Physiology; Methods of Examination; Clinical Aspects (Diagnosis); Peridontal Diseases in Children; Laboratory Findings; Bacteriology; Histopathology and pathogenesis; Focal Infection; Experimental Peridontal Diseases; Etiology; Treatment; Prophylaxis; Social Aspects.

AD-636 760 **Field 6E**
CFSTI Prices: HC$1.60 MF$0.50
Royal Dental Coll., Copenhagen (Denmark). Dept. of Oral Pathology.
SUPPLEMENT TO BIBLIOGRAPHY OF EUROPEAN LITERATURE ON PERIODONTAL DISEASES 1950-1959.
by Jens J. Pindborg. 1962, 15p
Contract AF 61 (052)-532
See also AD-636 759.

Descriptors: (*Teeth, Diseases), (*Dentistry, Bibliographies), Epidemiology, Pathology, Military medicine, Diagnosis, Children, Bacteria, Histology, Etiology, Nutrition, Hormones, Therapy, Surgery, Vitamin E, Tissue extracts, Reviews, Denmark, Europe.

For abstract, see T 66 18.

AD-636 765 **Field 6E, 6O, 6C**
CFSTI Prices: HC$2.00 MF$0.50
Chiba Univ. (Japan). Dept. of Parasitology.
STUDIES ON CHEMOTHERAPY AND SERODIAGNOSIS FOR CLONORCHIS SINENSIS INFECTION.
Final rept.
by Muneo Yokogawa. Jun 66, 28p
Contract DA-92-557-FEC-38282
ARDG-J-244-2

Descriptors: (*Parasitic diseases, *Chemotherapeutic agents), Trematodes, Serodiagnosis, Chemotherapy, Dosage, Infections, Tolerances (Physiology), Toxicity, Diagnosis, Therapy, Pathology, Medical examination, Urine, Liver function tests, Japan.

Identifiers: Feces, Clonorchis.

The authors conducted the first use of this drug for the treatment of clonorchiasis patients after confirming the satisfactory results in the animal experiments. Eight inpatients with clonorchiasis n the hospital were treated as the first human cases to receive 1, 4-bis-trichloromethylbenzol (Hetol). A daily dose of 100 mg/kg of Hetol was administered every other day for 5 doses in all. For one year after the completion of the treatment fecal examinations with centrifugation technique were periodically carried out. On the lapse of 3 to 5 weeks after the treatment, the feces became negative for Clonorchis eggs in all of the 8 cases and 7 cases except one case have since been continuing negative for eggs. Elaborated examinations for side effects due to Hetol revealed nothing abnormal in liver function test, urinalysis and in other respects. The results thus far described have led to conclusion that Hetol is safe to use for human clonorchiasis and is more effective than the conventionally used drugs. (Author)

AD-636 813 **Field 6E, 6M**
Army Biological Labs., Frederick, Md.
PATHOGENESIS AS RELATED TO PHYSIOLOGICAL STATE OF ANTHRAX SPORE AND CELL.
by Ralph E. Lincoln, Morris A. Rhian, Fred Klein, and Albert Fernelius. 1966, 20p

Descriptors: (*Bacillus anthracis, Diseases), Spores, Diagnosis, Pathology, Histology, Infections, Growth, Body temperature, Bacteria, Blood, Toxins + antitoxins, Immunity, Experimental data.

For abstract, see T 66 18.

AD-636 814 **Field 6E, 6M**
Army Biological Labs., Frederick, Md.
THE PATHOGENESIS OF PSITTACOSIS.
by Malcolm H. McGavran, Charles W. Beard, Richard F. Berendt, and Robert M. Nakamura. 18 Jan 62, 18p

Descriptors: (*Miyagawanella psittaci, Diseases), Aerosols, Monkeys, Morphology (Biology), Pathology, Lungs, Respiratory system, Infections.

Identifiers: Psittacosis-lymphogranuloma venereum-trachoma.

Twenty-four rhesus monkeys were exposed to a small-particle aerosol of the Borg strain of psittacosis virus. The average inhaled dose was approximately 5,000 MICLD50'S, a uniformly infective dose. None of the monkeys died of psittacosis. Serial morphologic studies showed that the initial site of infection wwas in the respiratory bronchiole. Subsequent contiguous centrifugal spread resulted in a lobular pneumonia. The maximal extent of the inflammatory reaction was reached by the 14th to 16th days and was coincident with the onset of resolution. Resolution was complete by the end of the fifth week. Anatomic evidence of infection was scant in organs other than the lung. A few minute mononuclear granulomas were found in the liver. Intracytoplasmic inclusions of the virus were found in the alveoli. These findings are illustrated and their significance discussed. (Author)

AD-636 815 **Field 6E, 6M**
Army Biological Labs., Frederick, Md.
PATHOGENESIS OF COCCIDIOIDES IMMITIS IN MONKEYS.
by J. L. Converse, E. P. Lowe, M. W. Castleberry, G. P. Blundell, and A. R. Besemer. 9 Nov 61, 8p

Descriptors: (*Coccidioides, Diseases), Pathology, Respiratory system, Lungs, Spores, Monkeys.

Respiratory exposure to arthrospores from the submerged growth of Coccidioides immitis, strain Cash, in liquid medium resulted in similar pathogenesis in monkeys to that of strain Silveira arthrospores harvested from solid medium. Infectivity of 100% was noted with doses of 50 to 10,000 arthrospores. The disease was characterized by loss of appetite and weight, malaise,and extreme respiratory distress accompaned by coughing, with the immediate cause of death being acute coccidioidal pneumonia. The pathological picture was one of extensive, progressive, destructive pulmonary disease in the higher dose levels and few, small, self-contained, fibrous lesions, with little destruction of lung tissue, in the low doses. This was correlated in general with the findings of serial X rays and serological tests. The presence of the parasitic phase (spherule and endospore) of the organism was noted in large numbers within the pulmonary lesions and bronchial exudates and was substantiated by cultural methods. Occasionally, hyphal elements of the saprophytic growth phase were noted around the periphery of residual cavitated areas of the lungs. (Author)

AD-636 817 **Field 6E, 6M**
Army Biological Labs., Frederick, Md.
IMMUNITY AGAINST TULAREMIA: PASSIVE PROTECTION OF MICE BY TRANSFER OF IMMUNE TISSUES.
by William Peter Allen. 24 Oct 61, 10p

Descriptors: (*Pasteurella tularensis, Immunity), (*Transplantation, Immunity), Tissues (Biology), Leukocytes, Immune serums, Vaccines, Resistance (Biological), Mice.

Acquired resistance to fully virulent strains of P. tularensis was passively transferred to normal mice by viable spleen cells or peritoneal leucocytes from donors that recovered from infection with an attenuated strain of P. tularensis. This passively transferred resistance was reflected in survival or delayed death after challenge of the recipients. The degree of passively transferred resistance was dependent upon the immune status of the donors and the number of viable immune cells transferred. There were indications that this resistance persisted only as long as the transferred tissues were compatible with the tissues of the recipient. The results support the hypothesis that immunity of mice against fully virulent strains of P. tularensis is associated with an altered state of the tissues. (Author)

AD-636 818 **Field 6E, 6M**
Army Biological Labs., Frederick, Md.
AEROGENIC IMMUNIZATION OF THE MONKEY AND GUINEA PIG WITH LIVE TULAREMIA VACCINE.
by Henry T. Eigelsbach, Jerry J. Tulis, Edwin L. Overholt, and William R. Griffith. 5 Sep 61, 3p

Descriptors: (*Pasteurella tularensis, Immunity), Vaccines, Aerosols, Injection (Medicine), Antigens + antibodies, Monkeys, Guinea pigs.

Studies were made on the clinical acceptability and immunogenicity of live tularemia vaccine administered to the monkey and guinea pig by the dermal or respiratory route. Aerogenic as well as dermal vaccination proved innocuous. Animals vaccinated aerogenically showed higher levels of

antibody and comparable if not greater protection against challenge with a highly virulent strain of P. tularensis than animals vaccinated dermally. (Author)

AD-636 854 **Field 6E, 6M**
Army Biological Labs., Frederick, Md.
STUDIES OF IMMUNITY TO TOXINS OF CLOSTRIDIUM BOTULINUM. VIII. IMMUNOLOGICAL RESPONSE OF MAN TO PURIFIED BIVALENT AB BOTULINUM TOXOID.
by Mary A. Fiock, Leonard F. Devine, Naomi F. Gearinger, James T. Duff, and George G. Wright. 20 May 61, 7p

Descriptors: (*Clostridium botulinum, Immunity), (*Toxic tolerances, Clostridium botulinum), Toxins + antitoxins, Antigens + antibodies, Humans, Guinea pigs, Immune serums, Injection (Medicine).

The response of man to immunization with a purified, bivalent, AB botulinum toxoid was investigated. The toxoid was well tolerated; only occasional mild local reactions were encountered. Four schedules of immunization were studied; 0.5-ml injections were given at 0, 2, 4 and 6 weeks, at 0 and 8 weeks, at 0, 2 and 10 weeks and at 0 and 10 weeks; serum antitoxin titers were determined at intervals thereafter. Titers of 0.02 unit of type A and 0.005 unit of type B antitoxin were considered satisfactory, since guinea pigs with these antitoxin levels survived intraperitoneal i.p. challenge with approximately 106 mouse i.p. LD50 of homologous toxin. The 0-2-10 week immunization schedule produced the highest proportion of satisfactory titers and the highest mean titers. Booster inoculations of 0.5 ml were given 1 year after the initial injection, except for one group in which boosters were given after 6 months. Marked increases in antitoxin titers were observed following the 1-year boosters, the mean titers reaching a value at least 500 times the satisfactory level and remaining well above this level for at least 2 years. Six-month boosters were considerably less effective, both with respect to the magnitude and to the duration of the secondary response. Prior immunization with univalent type A toxoid depressed the response to the type B component of the bivalent preparation. After storage for 3 1/4 years at 4C the toxoid appeared to have deteriorated slightly, although considerable antigenicity remained. (Author)

AD-636 878 **Field 6E, 6O, 6M**
Army Biological Labs., Frederick, Md.
THE EFFECTS OF 6-MERCAPTOPURINE ON VARIOLA INFECTIONS IN RHESUS MONKEYS. I. THE INFLUENCE OF THE DRUG ON THE RESISTANCE AND IMMUNOLOGICAL RESPONSE OF THE INFECTED HOST.
by Robert J. Janssen, Ronald G. Marshall, Peter J. Gerone, and Norman F. Cheville. 6 Mar 62, 8p

Descriptors: (*Variola virus, Resistance (Biological)), (*Purines, Immunity), Infectious diseases, Monkeys, Mortality rates, Antigens + antibodies, Diseases.

Identifiers: Mercaptopurine.

Rhesus monkeys that were treated with the purine analogue 6-mercaptopurine (6-MP) exhibited a decreased resistance to variola virus injected by the intravenous route. This decreased resistance was manifested most dramatically in terms of mortality, in that 6-MP-treated monkeys died following infection with variola virus, while untreated infected controls survived. Mortalities in animals treated with 6-MP and onset of fever and number of dermal lesions in treated and untreated animals occurred in direct relationship to the size of the viral inoculum. A blockage or delay of the primary antibody response was another manifestation of the activity of 6-MP in the infected monkeys. The purine analogue had little, if any, effect on reinfection with variola virus of animals that already possessed antibody for that virus. The results suggest that blockage of the primary antibody response may be a mechanism for the action of 6-MP in reducing the resistance of monkeys to variola virus. (Author)

AD-636 892 **Field 6E, 6M**
Army Biological Labs., Frederick, Md.
SMALLPOX AND RELATED POXVIRUS INFECTIONS IN THE SIMIAN HOST.
by Nicholas Hahon. 1960, 18p

Descriptors: (*Pox viruses, Monkeys), Variola virus, Vaccinia virus, Resistance (Biological), Pathology, Viability, Immunity, Etiology, Diseases, Vaccines, Tissue culture, Fluorescent antibody techniques.

Identifiers: Alastrim virus, Monkeypox virus.

Contents: Variola-Vaccinia Group of Poxviruses; Nature of Poxvirus Infections in Simian Host; Clinical Disease in Relation to Route of Virus Inoculation; Species Susceptibility; Pathogenicity and Virulence of Poxvirus Strains; Pathology in Relation to Route of Virus Inoculation; Cross-Immunity Relationships; Assessment and Duration of Immunity; Pathogenesis; Appraisal of Simian Smallpox in Relation to Public Health.

AD-636 893 **Field 6E, 6M**
Army Biological Labs., Frederick, Md.
IMMUNOLOGICAL STUDIES OF ANTHRAX. II. LEVELS OF IMMUNITY AGAINST BACILLUS ANTHRACIS OBTAINED WITH PROTECTIVE ANTIGEN AND LIVE VACCINE.
by Frederick Klien, Ira A. Dearmon Jr. Raplh E. Lincoln, Bill G. Mahlandt, and Albert L. Ferneliu. 12 Mar 61, 5p

Descriptors: (*Bacillus anthracis, *Immunity), (*Vaccines, Bacillus anthracis), Antigens + antibodies, Resistance (Biological), Spores.

Levels of resistance to challenge with spores of a virulent strain of Bacillus anthracis were measured by means of an immunity index. The immunizing effect of protective antigen alone produced a level of resistance approximately 1000-fold greater than that of controls. The effect of protective antigen and a supplemental injection of live vaccine was 100,000,000-fold. Live vaccine alone produced only a 10- to 15-fold increase in resistance. (Author)

AD-636 974 **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Army Medical Biochemical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
ANNUAL PROGRESS REPORT, 1 JULY 1965-30 JUNE 1966 (FY-1966).
by Peter M. Margetis, and Fred Leonard. 30 Jun 66, 46p RCS-MEDDH-288 (R1)
Projs. 3A013001A91C, 3A014501B71P

Descriptors: (*Prosthetics, Medical research), (*Medical supplies, Medical research), Adhesives, Tissues (Biology), Degradation, Abstracts, Reviews, Surgery, Plastics, Materials.

For abstract, see T 66 18.

AD-636 984 **Field 6E, 6O**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
PREPARATION AND USE OF STANNOUS FLUORIDE SOLUTIONS AND INGESTIBLE DENTIFRICE.
Aeromedical Reviews.
by Ira. L. Shannon. May 66, 13p Review-2-66

Descriptors: (*Tin compounds, Fluorides), (*Fluorides, *Dentistry), Toilet articles, Preparation, Teeth, Solutions, Ingestion (Physiology).

Identifiers: Dentifrices, Stannous fluoride.

The materials listed in the report were developed in the Experimental Dentistry Branch, USAF School of Aerospace Medicine, in response to specific USAF requirements in preventive dentistry. This review outlines procedures for the preparation and use of these compounds and, when applicable, provides directions for obtaining the fully prepared material. The USAF Dental Service endorsement of the SAM series of topical SnF2 agents is based upon in vitro studies demonstrating the ability of these preparations to protect dental enamel from acid decalcification. It has been shown that: (a) stannous fluoride solutions of low concentration provide excellent protection, and (b) stannous fluoride should be frequently applied to provide maximal benefit.

N66-16446 **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Naval Aerospace Medical Inst., Pensacola, Fla.
PRACTICAL AND THEORETICAL IMPLICATIONS BASED ON LONG-TERM FOLLOW-UP OF MENIERE'S PATIENTS TREATED WITH STREPTOMYCIN SULFATE.
by A. R. Fregly, M. E. McLeod, H. F. Schuknecht, A. Graybiel, and E. F. Miller. 25 Oct 65, 29p NAMI-948
Contract NASA Order-R-93
NASA-CR-69862

Descriptors: *Auditory perception, *Endolymph, *Semicircular canal, *Vestibular apparatus, *Hearing loss, *Streptomycin.

For abstract, see T 66 18.

N66-17666 **Field 6E**
CFSTI Prices: HC$1.50 MF$1.25
National Aeronautics and Space Administration, Washington, D. C.
PROGRESS IN DEVELOPMENT OF METHODS IN BONE DENSITOMETRY.
by D. W. Jenkins, W. F. Neumann, and G. D. Whedon. 1966, 199p NASA-SP-64
Proc. of Conf. held in Washington, D. C., Mar 25-27, 1965, sponsored by NASA, NIH, and Am. Inst. of Biol. Sci.

Descriptors: *Densitometer, *Vertebral column, *Bone, *Human body.

PB-170 666 **Field 6E**
CFSTI Prices: HC$2.60 MF$0. 50
Karl Landsteiner Foundation, Amsterdam (Netherlands).
IMMUNOLOGICAL STUDIES ON LEUKOCYTES: DEVELOPMENT OF MONOSPECIFIC ANTISERA; CELL SPECIFICITIES OF CYTOTOXIC ISO-ANTIBODIES; ISO-ANTIGENS ON SKIN FIBROBLASTS; PRESERVATION OF LYMPHOCYTES.
Semi-annual contract progress rept. 28 Jun 65-1 Mar 66.
by V. P. Eijsvoogel. 1 Mar 66, 22p
Contract PH-43-65-993

Descriptors: (*Leukocytes, Antigens + antibodies), Immune serums, Cytology, Toxicity, Skin, Lymphocytes, Preservation, Pregnancy, Immunology.

About 400 sera derived mostly from women during or after pregnancy were screened for the presence of leucocyte antibodies with the cytotoxic antibody test. 96 positively reacting sera were found. With some of these sera frequency studies and crossabsorption experiments were performed. Up to now at least six of these sera have given no indication of containing more than one antibody. Studies regarding the difference in cell specificity of the leucocyte antibodies were performed also. It was shown that three kinds of antibodies are demonstrable: antibodies directed against antigens present only on lymphocytes, antibodies directed against antigens present only on granulocytes and antibodies directed against antigens present on both types of cells. Studies on the presence of white cell iso-antigens on skin cells showed that

only those antigens that are present both on lymphocytes and granulocytes are demonstrable on fibroblasts grown from skin explants. The preservation of lymphocytes by freezing in liquid nitrogen was studied. Preliminary experiments showed variable results with recoveries between 50 - 95%. After working out a more standardized procedure, the quantitative recovery could be greatly improved. Studies regarding the qualitative recovery are in progress. (Author)

PB-170 667 **Field 6E**
CFSTI Prices: HC$1.10 MF$0.50
North Carolina Univ., Chapel Hill. Dept. of Biostatistics.
COMPUTATIONAL TECHNIQUES IN THE ELUCIDATION OF LEUKOCYTE ISOANTIGEN SYSTEMS.
Semiannual progress rept. 21 Jun 65-1 Mar 66.
by R. C. Elston. 1 Mar 66, 8p
Contract PH-43-65-1027

Descriptors: (*Leukocytes, Antigens + antibodies), (*Antigen-antibody reactions, Biometry), Programming (Computers), Population, Blood serum, Biological assay, Statistical analysis.

Identifiers: NUIT.

A computer program has been written in NUIT for the Univac 1105 electronic computer to sort a large number of sera into independent groups on the basis of a quantitative measure of their agglutination reactions with cells from a large number of different people. Within each group the sera are sorted into subgroups such that all pairs within a subgroup are positively associated, and all pairs in which each member of the pair is in a different subgroup are negatively associated. Statistical analysis of data indicated that if certain borderline results are excluded (that occur with a probability of 0.147), the probability of obtaining a false negative result is 0.270 and the probability of getting a false positive is zero. Furthermore there is little doubt that the frequency of obtaining false negative results depends to some extent on the donor of the cells, but the extent to which this is so is insignificant. A final analysis indicates that there is great day-to-day variability in the antigenic properties of cells from a particular donor, as measured by the assay technique used. The amount of this variability that is due purely to errors of the assay technique is yet to be determined. (Author)

PB-170 668 **Field 6E**
CFSTI Prices: HC$1.10 MF$0.50
Hopital Saint Louis, Paris (France). Institut de Recherches sur les Maladies du Sang.
A COMPARATIVE STUDY OF SEROLOGIC TECHNIQUES FOR THE DETECTION OF ANTI-LEUCOCYTE ANTIBODIES AND CORRELATION OF THE RESULTS OBTAINED WITH THE RESPONSE TO SKIN HOMOGRAFTS IN HUMAN SUBJECTS.
Semiannual progress rept. 1 Nov 65-1 Mar 66.
by J. Dausset. 31 Mar 66, 5p
Contract PH-43-65-986

Descriptors: (*Leukocytes, Antigens + antibodies), (*Antigens + antibodies, Serodiagnosis), (*Transplantation, Immunology), Females, Pregnancy, Lymphocytes, Toxicity, Immune serums, Skin, Test methods, Humans, France.

1,556 sera from multiparous women were tested and 112 were collected after delivery. Four pairs of brothers were cross-immunized: Two individuals developed circulating antibodies. Among six women immunized from the same donor, three developed circulating antibodies; two other volunteers developed circulating antibodies after immunization with leukocytes provided by a pool of 30 donors. Selected volunteers were also immunized by intradermal injections of leukocytes possessing only one antigen lacking in the recipient. Absorption experiments are made systematically on these sera. (Author)

AD-636 580 See Field 6F

AD-636 648 See Field 6R

AD-636 710 See Field 6P

AD-636 865 See Field 6M

AD-636 890 See Field 6M

AD-636 901 See Field 2E

AD-636 907 See Field 6M

PB-170 715 See Field 5B

6F. ENVIRONMENTAL BIOLOGY

AD-636 297 **Field 6F**
CFSTI Prices: HC$1.00 MF$0.50
IIT Research Inst., Chicago, Ill.
DEVELOPMENT OF AN ORALLY EFFECTIVE INSECT REPELLENT.
Quarterly progress rept. 1 May-30 Jul 66.
by Philip Kashin. 30 Jul 66, 21p IITRI-L6021-7
Contract DA-49-193-MD-2281
Proj. IITRI-L6021
See also AD-631 739.

Descriptors: (*Insect repellents, *Culicidae), Amino acids, Nerve impulses, Nervous system, Crustacea, Inhibition, Chemical compounds, Carbon dioxide, Biological assay, Effectiveness, Mouth, Insect control, Test methods.

Identifiers: Aminobutyric acids.

Certain GABA analogues were tested for mosquito repellency. The crayfish intestine preparation was further studied to detect the effects, if any, on inhibition of contractions by GABA with and without the presence of bicarbonate (HCO3) ion. Preliminary work was begun on the crayfish abdominal stretch receptor preparation, which may be a more sensitive assay for detection of GABA-CO2 complexes than the intestine preparation. Experiments were initiated to determine the effect of temperature on GABA-CO2 complexes. Amino acid analysis were performed on separated heads and bodies of mosquitoes. (Author)

AD-636 426 **Field 6F, 6C**
CFSTI Prices: HC$3.00 MF$0.75
California Univ., Berkeley. Dept. of Geography.
BIOGEOGRAPHIC ASPECTS OF MALARIA IN TRINIDAD.
by L. Schuyler Fonaroff. 1966, 74p
Contract Nonr-3656 (03)
Proj. NR-388-067
Prepared by San Fernando Valley State College, Northridge, Calif.

Descriptors: (*Trinidad, Plasmodium), (*Plasmodium, Diseases), Ecology, Disease vectors, Anopheles, Geography, Distribution, Public health, Insect control, Life cycle, Larvae, Antigens + antibodies, Rainfall, Tables.

The report attempts to document various aspects of malaria during the last twenty-five years of its existence on Trinidad. Although active malaria transmission has been stopped in direct response to public health measures, the persistence or reduction of the disease in some areas has not been proportional to the control effort. As in some other parts of the world, malaria receded in the absence of efforts expended on its control; in other areas, despite control measures it has stubbornly resisted eradication. This erratic characteristic of the disease still remains unexplained. The paper presents an introduction to the historical geography of Trinidadian malaria and offers analyses and suggestions for its changing character over the years.

AD-636 580 **Field 6F, 15B, 2A, 4B K**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
CBE FACTORS: MONTHLY SURVEY NO. 7.
1966, 94p ATD-66-85
TT-66-61906
Survey Series on Chemical, Biological, and Environmental Factors. See also AD-635 256.

Descriptors: (*Chemical warfare agents, Reviews), (*Biological warfare agents, Reviews), (*Environment, Reviews), Pesticides, Herbicides, Fertilizers, Hallucinogens, Epidemiology, Bacteria, Aerosols, Ecology, Micrometeorology, Soils, USSR, China, Eastern Europe, Abstracts.

This monthly survey, based on Communist World open sources covers the following areas: I. Chemical factors (pesticides, herbicides, fertilizers, psychotomimetics, other chemicals); II. Biological factors (pathogens); III. Environmental factors (aerosols, ecology, micrometeorology, soil science). Available translations of additional sources pertinent to the three subject areas are listed.

AD-636 816 **Field 6F, 6I.**
Army Biological Labs., Frederick, Md.
USE OF A PROTABLE INOCULATION TOWER IN LABORATORY, GREENHOUSE, AND FIELD TESTS OF FUNGICIDES TO CONTROL RICE BLAST.
by M. M. Kulick, and G. N. Asai. 1961, 4p

Descriptors: (*Fungicides, Test methods), (*Cereals, Diseases), (*Biological laboratories, Test facilities), Spores, Culture media, Distribution, Portable.

A portable inoculation tower was used to test a number of fungicides in the laboratory, greenhouse, and field for control of rice blast. It was used in the laboratory tests to disperse spores of Piricularia oryzae in Petri dishes that contained the fungicides spread on the surface of water agar. In the greenhouse and field tests, the tower was used to inoculate rice plants previously sprayed with fungicides. Eight of 24 fungicides screened in the laboratory were further tested in the greenhouse; 5 of these were later evaluated in the field. Of these 5 materials, 3 gave promising control of rice blast. (Author)

AD-636 895 **Field 6F, 18B**
Army Biological Labs., Frederick, Md.
RADIOISOTOPES IN ECOLOGICAL AND BIOLOGICAL STUDIES OF AGRICULTURAL INSECTS.
by D. W. Jenkins. 1960, 19p

Descriptors: (*Insect control, Radioactive isotopes), Agriculture, Insecticides, Pesticides, Disease vectors, Ecology, Labeled substances, Life cycle, Diseases, Plants (Botany), Viruses, Nutrition, Parasites, Animals, Radioactivity, Insects, Genetics.

Atomic energy used for research and control of agricultural and livestock insect pests has proved to be of very great value. Radioisotopes are an excellent tool in carrying out detailed and accurate ecological studies of insect pests required for effective control. With this information, economic control of insects can be carried out by hitting the weakest links and most vulnerable points using crop practices, quarantines, killing or sterilizing techniques, and other control-methods on a co-ordinated basis. Radioisotopes have been of value in labelling and studying the dispersal and movement, life history, and behaviour of underground insects, orchard and forest insects, honey bees, and cotton-and food-crop insects. They have been helpful in elucidating the role of plant-sucking in-

sects particularly with regard to plant virus transmission. Ecological studies have been carried out on radioisotope-tagges flies, ticks, mosquitoes and other insects which transmit diseases or are important pests of cattle and other domestic animals. Use of radioisotopes has contributed to the study of parasites and predators of agricultural and livestock pests and disease vectors. They have been of value in ecological studies on food chanins, nutrition cycles, and population studies. New and additional biological studies are suggested using radioisotopes and radiation. Certain plant-insect relationships can be explored using radioisotopes, for example in studying trace elements which sometimes form the basis of plant resistance to insect attack. They can be used in studying pollination of plants by insects. (Author)

AD-636 896 **Field 6F, 18B**
Army Biological Labs., Frederick, Md.
RADIOISOTOPES IN ENTOMOLOGICAL STUDIES OF ENDEMIC AND TROPICAL DISEASES.
by D. W. Jenkins. 1960, 33p

Descriptors: (*Insect control, *Radioactive isotopes), (*Tropical regions, Diseases), Insects, Disease vectors, Arthropods, Epidemiology, Life cycle, Labeled substances, Insecticides, Pesticides, Pest control, Radioactivity, Ecology, Parasites, Genetics, Resistance (Biological).

Radioisotopes and radiation have contributed greatly in solving entomological problems in endemic and tropical diseases. About five hundred publications have been reviewed on uses of atomic energy in study and control of medically-important insects and their relation to human disease. Radioisotopes have enabled solutions to research and control problems that have been difficult or impossible by conventional methods. The value and practicability of this research tool is discussed with relation to epidemiological studies on dispersal, migration, life history, populations, and disease transmission by arthropod vectors. The uses of atomic energy in control of arthropods by insecticides, irradiation and sterilization, and natural control are reviewed. The uses of radioactive materials in studying problems of the relationships of disease vector insects and parasites to animal and human hosts are presented. Suggestions and recommendations for new and additional studies using radioisotopes and radiation are made to help to solve outstanding problems in the field of endemic and tropical diseases. Co-ordinated use of irradiation, insecticides, special chemicals and hormones, special genetic characters, and natural control of pest and disease vector arthropods is suggested. Use of irradiation in learning the genetics of medically-important insects is a promising new field that may provide sterile intersexes and hybrids, genes causing abnormal sex ratios, sterility factors, and other characters that may present new methods of insect control. (Author)

N66-17273 **Field 6F**
CFSTI Prices: HC$1.00 MF$0.50
Miami Univ., Coral Gables, Fla. Inst. of Molecular Evolution.
INVESTIGATIONS IN SPACE-RELATED BIOLOGY.
Semiannual status rept, 1 Jun - 1 Dec 65.
1965, 11p
Grant NSg-689
NASA-CR-70384

Descriptors: *Organic chemistry, *Amion acid, *Catalytic activity, *Chemical property *Polynucleotide.

For abstract, see T 66 18.

PB-170 375 **See Field 8H**

6G. ESCAPE, RESCUE, AND SURVIVAL

AD-636 962 **Field 6G, 5I, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Military Research and Devlopment Center, Bangkok (Thailand).
SURVIVAL MANUAL FOR THAILAND AND ADJACENT AREAS.
by Tem Smithinand, and Wilbur R. Scheible. 1966, 142p Rept. no. 66-013
Text in Thai; abstract in English.

Descriptors: (*Thailand, *Survival), Instruction manuals, Military training, Armed forces (Foreign), Ecology.

This survival manual is intended for the use of Royal Thai Armed forces, and is published in Thai throughout, without English translation. The text and the 58 illustrations are based on material in standard U. S. and U.K. military manuals on survival. The text is divided into 12 chapters, each of which contains a discussion of one basic aspect of survival, such as first aid, navigation, or cooking. A separate, 250-page Annex to this manual has been published by the Military Research and Development Center, Bangkok. The Annex describes a number of common Edible and Poisonous Plants and Animals of Thailand and adjacent areas. The Annex is in English. There is a Thai translation of the Abstract, Table of Contents and Introduction, and the captions to the 72 illustrations are in English and Thai. (Author)

AD-636 521 **See Field 5I**

AD-636 989 **See Field 6S**

6H. FOOD

AD-636 331 **Field 6H, 7C**
CFSTI Prices: HC$1.60 MF$0.50
Army Natick Labs., Mass. Pioneering Research Div.
THE DETERMINATION OF THE VOLATILE COMPONENTS OF FOODSTUFFS. III. COFFEE AROMA.
Research rept.
by James H. Sullivan, Donald H. Robertson, and Charles Merritt Jr. 30 Sep 59, 16p Analytical Chemistry-12

Descriptors: (*Food, Vapors), (*Coffee, *Odors), Mass spectroscopy, Identification, Determination, Furans, Aldehydes, Esters, Alcohols, Nitriles, Sulfur compounds, Distillation.

Mass spectrometric analysis led to the identification of several components of coffee aroma. The volatile compounds from ground roasted coffee are collected by distillation under high vacuum at room temperature into a receiver at liquid nitrogen temperature. Direct fractionation of a 'center cut' on the mass spectrometer and subsequent analysis has shown the presence of more than twenty compounds. Among the compounds identified are furans, aldehydes, esters, alcohols, nitriles and sulfur compounds. The techniques which were used offer the following advantages: (1) The method of collection by vacuum distillation in a closed system is superior to other methods of collection. (2) A minimum of sample handling reduces greatly any loss of material. (3) Direct analysis on the spectrometer permits a complete qualitative analysis in a rapid, efficient manner and also provides for the extension to quantitative analysis, if desired. (Author)

AD-636 784 **Field 6H**
National Research Council of Canada, Ottawa (Ontario). Div. of Biosciences.
RELATIVE HUMIDITY AND THE REFRIGERATED STORAGE OF CARROTS AND CABBAGES.
by L. van den Berg, and C. P. Lentz. Jul 66, 4p
NRC-9074

Descriptors: (*Vegetables, Storage), Humidity, Preservation, Temperature, Refrigeration systems, Canada.

Identifiers: Cabbages, Carrots.

Tests made during three storage seasons with four varieties of carrots and three varieties of cabbages, from four growing areas, showed that both vegetables kept better and longer when stored at high relative humidity (98-100%) than when stored at a lower level of relative humidity (90-95%). The temperature was 32-34F in these tests. At 98-100% as compared with 90-95% relative humidity, weight losses were markedly reduced, resulting in a firmer, crisper and juicier product, and losses from decay were generally also reduced. In addition, green cabbage kept its color better at the higher relative humidity. The results show that maintaining high relative humidity and uniformly low temperature, as is possible with a jacket-type refrigerated storage room, will permit suitable varieties of carrots to be stored for nine months or more, and cabbage for six to eight months. (Author)

MIT-3343-26 **Field 6H, 18B**
CFSTI Prices: HC$3.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
SIMULTANEOUS RADIATION-HEATING TREATMENT OF PRECOOKED MARINE PRODUCTS.
Final rept, 1 Feb 65-28 Feb 66.
by S. A. Goldblith, and J. T. R. Nickerson. May 66, 52p
Contract AT (30-1)-3343

Descriptors: (*Irradiated foods, Seafood), (*Seafood, Preservation).

For abstract, see N 20 16.

TID-22515 **Field 6H, 18B**
CFSTI Prices: HC$4.00 MF$1.00
Bureau of Commercial Fisheries, Seattle, Wash. Technological Lab.
APPLICATION OF RADIATION-PASTEURIZATION PROCESSES TO PACIFIC CRAB AND FLOUNDER.
Final summary rept., Nov 64-Oct 65.
by David Miyauchi, John Spinelli, and Gretchen Pelroy. Nov 65, 131p
Contract AT (49-11)-2058

Descriptors: (*Irradiated foods, Seafood), (*Seafood, Pasteurization).

For abstract, see N 20 16.

6K. LIFE SUPPORT

AD-637 005 **Field 6K**
American Inst. of Biological Sciences, Washington, D. C.
HUMAN ECOLOGY IN SPACE FLIGHT, VOLUME I.
by Doris Howes Calloway. 1966, 285p
Proceedings of the International Interdisciplinary Conference (1st), held at Princeton New Jersey, October 13-16, 1963.

Descriptors: (*Ecology, *Space flight), (*Closed ecological systems, Atmosphere), Humans, Spacecraft cabins, Gas generating systems, Gravity, Acceleration.

Contents: Cabin atmosphere; Regenerative systems; Gravity and acceleration; Radiation in space.

N66-11759 **Field 6K**
CFSTI Prices: HC$4.00 MF$0.75
Hamilton Standard Div., United Aircraft Corp., Broad Brook, Conn.
MARS LANDING AND RECONNAISSANCE MISSION, ENVIRONMENTAL CONTROL, AND LIFE SUPPORT SYSTEM STUDY. VOLUME I. STUDY SUMMARY AND CONCLUSIONS.

1964, 105p SLS-414-1
Contract NAS9-1701
NASA-CR-68000

Descriptors: *Life support system, *Mars (Planet), *Environmental control, *Mission planning, *Planetary landing.

For abstract, see T 66 18.

6L. MEDICAL AND HOSPITAL EQUIPMENT

AD-468 375 **Field 6L**
CFSTI Prices: HC$1.60 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
TELUS (TELEMETRIC UNIVERSAL SENSOR).
Rept. for Jul 63-Dec 64.
by William G. Glenn, Wesley E. Prather, and Heinz A. Jaeger. May 65, 14p SAM-TR-65-1
Task 775402

Descriptors: (*Telemeter systems, Biology), Laboratory equipment, Biological laboratories, Instrumentation, Telemetering data, Physiology, Coding, Data processing systems, Information retrieval, Radio receivers, Detectors.

Identifiers: Telus, Sensors.

There was need for a flexible complex of receiving and evaluating instruments for sensing physiologic and biologic analyses performed remotely by various field transducers. This need has been met by the design and development of TELUS (Telemetric Universal Sensor), a one-man laboratory console capable of receiving, quantitating, comparing, coding, storing, searching, retrieving, and distributing electrical and electromagnetic data. These data are received and distributed by radio and telephone. Field tests of TELUS indicate good performance characteristics for evaluating four channels of telemetered data and providing two-way communication between the laboratory and remote testing areas. (Author)

AD-636 712 **Field 6L, 11A**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
THE N-ALKYL ALPHA CYANOACRYLATE TISSUE ADHESIVES.
Technical rept.
by Fred Leonard. May 66, 20p TR-6610
Proj. DA-3A013001A91C

Descriptors: (*Surgical supplies, Adhesives), (*Tissues (Biology), *Adhesives), (*Acrylic resins, Adhesives), Nitriles, Polymerization, Degradation.

Identifiers: Hemostatic agents, Polycyanoacrylates, Tissue adhesives.

A summary is given of studies directed toward the development of biologically receptive adhesives to be used as hemostasis inducing compounds and tissue adhesives in nonsuture closure of wounds. In addition to the usually delineated attributes of polymers for implant use, such as nontoxicity, non-allergenicity, etc., a tissue adhesive, ideally should (1) wet and spread on the tissue substrate, (2) polymerize rapidly and form a polymeric film (preferably a flexible one) which coats the tissue substrate, and (3) be biodegradable. The n-alkyl alpha cyanoacrylates fulfill these requirements to varying degrees.

AD-636 716 **Field 6L, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
POLYLACTIC ACID FOR SURGICAL IMPLANTS.
Technical rept.
by R. K. Kulkarni, K. C. Pani, C. Neuman, and F. Leonard. Apr 66, 15p TR-6608
Proj. DA-3A013001A9-1C

Descriptors: (*Surgical supplies, Implants), (*Implants, Materials), (*Lactic acids, *Polymers), Films, Fibers (Synthetic), Toxicity, Degradation, Histology.

Identifiers: Polylactic acids.

High molecular weight polymer from lactic acid can be made from the cyclic lactide intermediate, suitable for casting films or spinning fibers. The films are quire permeable to water vapor and can soften in presence of water. Histological studies indicate that the polylactic acid is non-toxic, nontissue reactive, and biodegradable, as evidenced further by the study of degradation of C14 tagged polymer in vivo. The degradation studies also point out that the polymer or its degradation products are not retained in any of the vital organs of the anaials. The polymer implant, however, degrades slowly in vivo, losing 12-14% in three months. This study indicates polylactic acid to be a very suitable material for sutures, vascular grafts, and other surgical implants. (Author)

AD-636 846 **Field 6L, 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Center, Frederick, Md.
STERILIZATION WITH METHYL BROMIDE VAPOR.
by Daniel L. Jones, and Charles R. Phillips. Jul 66, 22p Technical manuscript-304

Descriptors: (*Germicides, *Halogenated hydrocarbons), (*Bromine compounds, Germicides), Bacteria, Spores, Bacillus subtilis, Escherichia coli, Staphyloccus aureus, Vapors, Humidity, p+1.

Identifiers: Methylene bromide.

Methyl bromide vapor was shown to be bactericidal for the spores of Bacillus subtilis, and the vegetative cells of Staphylococcus aureus and Escherichia coli. The disinfection rate of B. subtilis spores has been determined for five different temperatures. Bacteria dried on cloth patches are sterilized more rapidly by methyl bromide vapor in atmospheres of low relative humidity than in atmospheres of higher relative humidity. Organisms in aqueous suspension can be sterilized by the admission of methyl bromide vapor to the atmosphere above the suspension in spite of the low solubility of methyl bromide in water. Such sterilization is not greatly influenced by changes in pH of the aqueous suspension, nor by the presence of organic matter of salt dissolved in the water. Methyl bromide has only about one-tenth the activity of ethylene oxide as a gaseous disinfectant, but since it is nonflammable it can be used in large-scale operations where safety precautions prohibit the use of ethylene oxide. It is believed that the mechanism is one of direct alkylation of protein material within the bacterial cell by methyl bromide. (Author)

AD-636 856 **Field 6L, 6M**
Army Biological Labs., Frederick, Md.
SAFETY EDUCATION FOR STUDENTS OF MICROBIOLOGY.
by G. Briggs Phillips. Dec 61, 5p

Descriptors: (*Biological laboratories, Safety), Infections, Medical technicians, Infectious diseases, Education, Hazards, Control.

For abstract, see T 66 18.

AD-636 900 **Field 6L, 6M**
Army Biological Labs., Frederick, Md.
AN APPARATUS FOR AERATION OF TISSUE CELLS IN SUSPENDED CULTURE WITH CONTROLLED GAS MIXTURES.
by W. F. Daniels, and E. W. Browning. 1962, 8p

Descriptors: (*Tissue culture, Instrumentation), (*Cells (Biology), Gases), Carbon dioxide, Oxygen, Oxygen equipment, Laboratory equipment.

An apparatus is described for the aeration of a series of tissue cultures at rates which may be varied independently for each vessel. The composition of the aerating gas can be adjusted to any desired percentages of CO2 and O2. While designed particularly for study of the aeration requirements of submerged tissue growth, the equipment is equally adaptable for study of submerged growth of bacterial and other systems. The apparatus was designed for future scale-up and is adaptable to both the overlay and bubble-through types of aeration. Flow rates necessary for producing mixtures of 5.0% CO2 and 95.0% air or 5.6% CO2, 14.0% O2, and 80.4% nitrogen are given. The described system was operated satisfactorily and proved to be an inexpensive and useful research tool. (Author)

AD-636 447 **See Field 17H**

AD-636 816 **See Field 6F**

AD-636 867 **See Field 6M**

AD-636 898 **See Field 6M**

AD-636 902 **See Field 6M**

6M. MICROBIOLOGY

AD-636 695 **Field 6M**
CFSTI Prices: HC$1.60 MF$0.50
Karolinska Institutet, Stockholm (Sweden). Dept. of Cell Research.
AUTOFLUORESCENT GRANULES IN CELLS OF HUMAN DERMIS. II. HISTOCHEMICAL OBSERVATIONS.
by Gunnar D. Bloom, and E. Martin Ritzen. 1963, 19p
Grant PHS-C-4716

Descriptors: (*Granules, *Fluorescence), (*Cells (Biology), Fluorescence), (*Skin, Fluorescence), Cytoplasm, Connective tissue, Phagocytes, Histological techniques, Sweden.

Cells with autofluorescent granules are common in the dermal connective tissue of human skin. The cytoplasmic granules appear to be of lipo-pigment nature. The cells show phagocytic properties and it can therefore not be excluded that the cytoplasmic granular structures are ingested material. There are certain similarities between the observed dermal autofluorescent cells (DAF-cells) and chromatophores (melanophages) of the dermis. Convincing histochemical evidence has not been obtained for the presence of catecholamines in these fluorescent cells, which has been suggested. (Author)

AD-636 697 **Field 6M, 6A**
CFSTI Prices: HC$1.10 MF$0.50
Karolinska Institutet, Stockholm (Sweden). Surgical Clinic.
INVESTIGATIONS ON MONOAMINO STORING CELLS IN THE SKIN AND OTHER TISSUES.
Summary progress rept.
by J. Adams-Ray, K. Fuxe, and N.-A. Hillarp. 15 Aug 63, 5p
Contract AF 61 (052)-450

Descriptors: (*Cells (Biology), *Amines), (*Skin, Amines), Histological techniques, Fluorescence, Tissues (Biology), Epinepherine, Levarterenol, Metabolism, Drugs, Sweden.

Identifiers: Catecholamines.

With the use of new fluorescence methods (and also conventional histological and histochemical methods) and with the help of drugs interfering with the formation, storage, release or inactivation of monoamines extensive experiments were start-

ed to elucidate the existence and significance of local amine stores in the tissues - especially the skin - of mannals. The results obtained are briefly summarized.

AD-636 768 **Field 6M, 6A**
Kyoto Univ. (Japan). Dept. of Serology and Immunology.
STUDIES ON INTERRELATION BETWEEN VIRUS AND HOST AT THE MOLECULAR LEVEL.
Final rept. Jun 65-66.
by Hisao Uetake. Jun 66, 35p
Contract DA-92-557-FEC-38281
Proj. DA-2N014501B71D
Task 00-068FE
ARDG-J-191-4

Descriptors: (*Viruses, Biochemistry), (*Bacteriphages, *Genetics), Ribonucleic acids, Metabolism, Bacteria, Antigens + antibodies, Nucleic acid components, Salmonella, Tracer studies, Molecular structure, Mutations, Chromosomes, Japan.

Identifiers: Lysogenization.

Results of studies in the following areas are reported: ribonucleic acid metabolism in bacterial cells infected with temperate phages; in vitro synthesis of the determinant 34 of the Salmonella O-antigen; chemical structure of the receptor for phage g341 and genetic function of phage g341; isolation and classification of +-epsilon mutants of phage epsilon-34; development of procedures for delysogenization.

AD-636 781 **Field 6M**
Prairie Regional Lab., Saskatoon (Saskatchewan).
DYNAMIC ASPECTS OF GROWTH AND METABOLISM IN CANDIDA UTILIS.
by P. S. S. Dawson. 1965, 13p NRC-9012

Descriptors: (*Candida, Growth), (*Metabolism, Candida), Culture media, Enzymes, Amino acids, Chromatographic analysis, Canada.

In the experiments reported here, the use of simple chemically defined media and closely controlled conditions of growth ensured that the metabolites extracted from the cells were products of the cell metabolism and directly reflected the active metabolism of the cells. The amino-acid and other metabolic pools, as registers of the cell metabolism, showed that the metabolism of the cell was in continual flux throughout the whole of its growth, whatever the rate of that growth. The results established that whereas the batch growth outlined the metabolic range of the organism and chemostat cultures enabled selected steady states to be closely examined, continuous phased cultures enabled this to be done on the basis of the cell cycle. The pattern of metabolism over the cell cycle, as portrayed by the pool changes, was characteristic of the environment of the cells, and was constant, as a repeating pattern over the cycle, when the environment was constant.

AD-636 812 **Field 6M, 6A**
Army Biological Labs., Frederick, Md.
BIOCHEMICAL STUDIES OF HOST-PARASITE INTERACTION IN TULAREMIA.
by John P. Bowden. 22 Jun 61, 7p

Descriptors: (*Pasteurella tularensis, Biochemistry), In vivo analysis, Respiration, Oxygen consumption, Amino acids, Stereochemistry, Molecular isomerism, Culture media, Rats.

Rat lymph node slices were successfully maintained in vitro with a steady, nearly optimal rate of respiration for at least 5.5 hours on a medium consisting solely of glucose, mineral salts, L-glutamine, L-histidine and L-cysteine. When the L stereoisomers were replaced with the D isomers, the tissue generally respired at a lower rate. Cysteine could be replaced with cystine and glutathione, but glutamic acid and glutathione could not replace glutamine in the medium without a noticeable drop in the respiration rate. The rate of oxygen uptake of rat lymph tissue maintained in vitro on natural and synthetic mediums was observed to decrease significantly when live Pasteurella tularensis organisms or filtrates from P. tularensis cultures were included in the medium. Nearly optimal respiration was restored by adding serum or an amino acid mixture to the medium. In experiments where filtrates from P. tularensis cultures grown in synthetic medium were used as culture medium for lymph node slices, the addition of cysteine alone was sufficient to restore the initial rate of oxygen uptake. (Author)

AD-636 819 **Field 6M**
Sir William Dunn School of Pathology, Univ. of Oxford (England).
INFLUENCE OF SPERMINE AND RELATED SUBSTANCES ON SUSCEPTIBILITY OF BACILLUS ANTHRACIS TO LYSOZYME.
by George G. Wright. 5 Sep 61, 3p

Descriptors: (*Bacillus anthracis, *Muramidase), Culture media, Growth, Yeasts, Resistance (Biological).

Identifiers: Spermine.

For abstract, see T 66 18.

AD-636 820 **Field 6M**
Army Biological Labs., Frederick, Md.
INFLUENCE OF GUINEA PIG PLASMA FACTORS ON PHAGOCYTOSIS OF PASTEURELLA PESTIS. I. PLASMA FROM NORMAL GUINEA PIGS.
by W. G. Stanziale, and J. D. White. 1 Aug 61, 7p

Descriptors: (*Pasteurella pestis, *Phagocytes), Guinea pigs, Immune serums, Blood plasma, Leukocytes, Blood proteins, Fibrinogen.

The existence of an enhancing effect of normal guinea pig plasma on the phagocytosis of Pasteurella pestis has been reaffirmed, using a test system consisting of neutrophils from normal nonimmune guinea pigs as the phagocytes. This enhancing influence was found to be attributable to the interplay of a thermolabile and a thermostable plasma component. The data suggest a consideration of complement as the thermolabile component, since the enhancing activity of plasma is destroyed by heating to 56 C and restored by addition of fresh plasma. The possibility that the thermolabile plasma component is opsonin was discounted. Surface alterations which did occur resulted in preserving the integrity of the envelope substance of the plague bacillus. Treatment of neutrophils with plasma prior to phagocytosis did not increase their phagocytic capacity. The thermostable enhancing component was not demonstrated to be present in any of three purified serum protein fractions tested. In fact, all of these fractions inhibited phagocytosis of P. pestis. An enhancing effect of purified fibrinogen could not be demonstrated. (Author)

AD-636 821 **Field 6M**
Army Biological Labs., Frederick, Md.
INFLUENCE OF GUINEA PIG PLASMA FACTORS ON PHAGOCYTOSIS OF PASTEURELLA PESTIS. II. PLASMA FROM PLAGUE-INFECTED GUINEA PIGS.
by W. G. Stanziale, and J. D. White. 1 Aug 61, 6p

Descriptors: (*Pasteurella pestis, *Phagocytes), Diseases, Convalescence, Blood plasma, Immune serums, Guinea pigs.

The phagocytosis enhancing property of normal guinea pig plasma was altered during experimental plague infection. The most notable changes occurred in the plasma from afebrile, moribund animals and from those convalescing from acute infection. The plasma of the moribund guinea pigs, which was obtained 7 to 8 days after exposure to Pasteurella pestis, inhibited phagocytosis to a considerable degree. Plasma from convalescent guinea pigs enhanced phagocytosis to a higher degree than the plasma of normal animals. In contrast, plasma from recovered guinea pigs in which cultural or serological evidence of infection was not demonstrated enhanced phagocytosis to a degree equivalent to that of normal plasma. Plasma taken from guinea pigs during the febrile phase of plague infection enhanced phagocytosis to a lower degree than did normal plasma. (Author)

AD-636 822 **Field 6M**
Army Biological Labs., Frederick, Md.
TRANSDUCTION IN BACILLUS SUBTILIS.
by Curtis B. Thorne. 13 Jul 61, 6p

Descriptors: (*Bacillus subtilis, Genetics), Bacteriophages, Mutations, Growth, Life cycle, Heat transfer, Immune serums, Culture media.

Phage propagated on a streptomycin-resistant mutant of the wild-type strain W-23 was capable of transducing to prototrophy strain 168 (indole-), as well as all of the auxotrophic mutants of W-23-Sr tested, which included mutants requiring arginine, histidine, adenine, guanine, thiamine, leucine, or methionine. Although strain 168 was transduced by phage SP-10, lytic activity on this strain could not be detected and attempts to propagate the phage on it failed. Transductions occurred at frequencies in the range of .000001 to .00001 per plaque-forming unit. Homologous phage was ineffective, deoxyribonuclease had no effect on the frequency of transduction, and transduction was prevented by the addition of phage antiserum. Phage SP-10 was capable of lysogenizing strain W-23-Sr, and this condition was maintained through repeated growth and sporulation cycles in potato-extract medium. Although heating at 65 C for 60 min inactivated free phage particles, spores retained their lysogenic condition after such heat treatment. When heat-treated spores of the lysogenic cultures were used as inocula for growth in a nutrient broth-yeast extract-glucose medium, filtrates contained 10 to the 9th power, or more, phage particles per ml. (Author)

AD-636 823 **Field 6M, 6C**
Army Biological Labs., Frederick, Md.
EFFECT OF ULTRAHIGH VACUUM ON VIABILITY OF MICROORGANISMS.
by Dorothy M. Portner, David R. Spiner, Robert K. Hoffman, and Charles R. Phillips. 9 Aug 61, 2p

Descriptors: (*Space biology, Microorganisms), (*Viability, Space biology), (*Microorganisms, Viability), Resistance (Biological), Vacuum, Biological contamination, Spacecraft.

Three species of resistant microorganisms were exposed for 5 days to an ultrahigh vacuum approaching that of interplanetary space. Since no lethal effect was observed, there is no indication that the vacuum of outer space would prevent transport of viable microorganisms on unsterilized space vehicles. (Author)

AD-636 824 **Field 6M**
Army Biological Labs., Frederick, Md.
REPLICATION OF VARIOLA VIRUS IN SUSPENDED CULTURES OF MAMMALIAN CELLS.
by Leonard A. Mika, and James B. Pirsch. 19 Apr 61, 4p

Descriptors: (*Variola virus, Tissue culture), Growth, Tissue culture cells, Mammals, Viability.

The studies describe the successful propagation of variola virus in spinner cultures of mammalian cells, and the factors which influence its growth.

Five established cell lines were used for the propagation of variola virus in a spinner culture system. Low doses of virus did initiate an infection but virus yields did not approach those obtained when an intermediate inoculum was used. Although the nonviable cell population remained low during the course of infection with an intermediate amount of virus, with an inoculum of 100,000 infectious units per ml or higher, the percentage of nonviable cells increased rapidly and by the sixth day after infection the population was totally nonviable. Intracellular replication of variola virus occurred early and rapidly in a spinner culture of guinea pig lung cells, whereas the liberation of virus into the suspending medium was a more gradual process. Several complete medium changes tend to maintain a suitable environment for the infected cell culture resulting in fairly high and constant viral titers over a period of 7 days. (Author)

AD-636 849 **Field 6M**
Army Biological Labs., Frederick, Md.
TEMPERATURE-GRADIENT PLATES FOR GROWTH OF MICROORGANISMS.
by Otto E. Landman, Howard T. Bausum, and Thomas S. Matney. 17 Aug 61, 7p

Descriptors: (*Culture media, Temperature), Laboratory equipment, Aluminum, Thermal insulation, Bacteria, Growth.

Different temperature-gradient plates have been devised for the study of microbial growth on solid media through continuous temperature ranges or in liquid media at finely graded temperatures. All plates are made of heavy-gauge aluminum; heat supplied at one end is dissipated along the length of the metal so that a gradient is produced. The shape and range of the gradient depends on the amount of heat supplied, the insulation, the ambient temperature, and other factors. Differences of 0.2 C in temperature sensitivity between bacterial strains can be detected. The plates are simple to construct and operate. The dimensions of the aluminum, the mode of temperature measurement, and the method of heating may all be modified without diminishing the basic utility of the device. A sharp growth front develops at the maximal temperature of growth of bacteria. In most strains, all bacteria below the front form colonies and all bacteria above the front are killed, except for a few temperature-resistant mutants. (Author)

AD-636 851 **Field 6M**
Army Biological Labs., Frederick, Md.
A COMMENT ON THE FERTILITY OF F2 DONOR TYPES OF ESCHERICHIA COLI K12.
by Thomas S. Matney, and Neil E. Achenbach. 14 Sep 62, 3p

Descriptors: (*Escherichia coli, Fertility), Reproduction (Physiology), Culture media, Chromosomes.

For abstract, see T 66 18.

AD-636 852 **Field 6M**
Army Biological Labs., Frederick, Md.
VIABILITY AND ESTIMATION OF SHELF-LIFE OF BACTERIAL POPULATIONS.
by Ira A. DeArmon Jr, Michael D. Orlando, Albert J.Rosenwald, Frederick Klein, and Albert L. Fernelius. 15 Mar 62, 6p

Descriptors: (*Bacteria, Viability), (*Viability, Mathematical analysis), Bacillus anthracis, Pasteurella tularensis, Spores, Storage.

Mathematical concepts associated with the exponential and probit models are developed, and the similarity of the two methods is discussed. Because of its greater flexibility in design, the probit method was used to estimate the shelf-life for four bacterial populations, wet and dry spores of Bacillus anthracis and wet and dry cells of Pasteurella tularensis. On the basis of data gained by storing these organisms at high temperature, the probit method was used to predict the time at which 50% viability would occur for cells stored at 3 C. Aplane passing through a three-space showing change in percentage viability of bacteria was formulated by a multiple regression method. With this functional technique, the percentage viability, expressed as a probit, was linearily related to a logarithm of storage time and storage temperature. The use of this method to study the effect of controlled variables on the viability of cells is demonstrated by comparing the effect of viability associated with three additives used prior to drying. The results of the test gave shelf-life estimates which were too low for all additives; however, the order of stability was ranked properly as confirmed by long-term tests. (Author)

AD-636 853 **Field 6M**
Army Biological Labs., Frederick, Md.
MECHANISM OF ACTION OF THE TOXIN OF BACILLUS ANTHRACIS. II. ALKALINE PHOSPHATASEMIA PRODUCED BY CULTURE FILTRATES OF VARIOUS BACILLI.
by Milton W. Slein, and Gerald F. Logan Jr. 21 Aug 61, 11p

Descriptors: (*Bacillus anthracis, *Toxins + antitoxins), Phosphoric monester hydrolases, Blood, Bacillus, Culture media, Immune serums, Ascorbic acid, Deficiency diseases, Immunity, Bone, Kidneys, Leukocytes, Guinea pigs.

A factor which produces hyperphosphatasemia after intravenous injection into animals has been found in culture filtrates of several bacilli. The factor appears not to be lecithinase, although it has been found only in culture filtrates of microorganisms, such as Bacillus cereus variants and B. thuringiensis, which are known to produce lecithinase. The factor has been shown to be different from the protective antigen fraction of the toxin of B. anthracis. The phosphatasemic response can be prevented by mixing the factor with antiserum before injection. Immunological tests indicate that the centers of ossification may be a principal source of the excess alkaline phosphatase which is liberated into the bloodstream. However, moderate changes in bone alkaline phosphatase activity levels, brought about by the development of scurvy in guinea pigs or by treatment of scorbutic guinea pigs with ascorbic acid, did not seem to affect the phosphatasemic response of the animals. Marked release of alkaline phosphatase occurs when slices of rabbit epiphyseal bone or kidney cortex, or suspensions of leukocytes, are incubated with small amounts of the phosphatasemia factor. (Author)

AD-636 855 **Field 6M**
Army Biological Labs., Frederick, Md.
STUDIES ON IMMUNITY IN ANTHRAX. IX. EFFECT OF VARIATIONS IN CULTURAL CONDITIONS ON ELABORATION OF PROTECTIVE ANTIGEN BY STRAINS OF BACILLUS ANTHRACIS.
by George G. Wright, Milton Puziss, and W. Brock Neely. 11 Sep 61, 8p

Descriptors: (*Bacillus anthracis, Immunity), (*Culture media, Bacillus anthracis), Antigens + antibodies, Mutations, Growth, Amino acids.

Nonproteolytic and nonencapsulated avirulent mutants were isolated from six virulent strains of Bacillus anthracis and tested for elaboration of protective antigen in the chemically defined medium developed previously (599 medium). Initially the strains grew rather slowly in 599 medium; serial transfer in the medium increased the rate of growth but reduced the elaboration of antigen. Two of the strains tended to revert to the encapsulated form during serial passage in 599 medium. Modifications in the medium and cultural conditions were studied in an attempt to obtain improved growth; the most significant alterations were the addition of adenosine and L-alanine, reduction in the concentration of ferrous sulfate, and growth under anaerobic conditions with agitation. Study of amino acid utilization in the medium revealed that the concentrations of certain amino acids could be reduced. These modifications, together with substitution of more productive strains, resulted in an approximately fivefold increase in elaboration of protective antigen, and greatly simplified production of the antigen on a practical scale. Omission of bicarbonate from the medium had no significant influence on utilization of amino acids. (Author)

AD-636 857 **Field 6M**
Army Biological Labs., Frederick, Md.
SEPARATION OF THE TOXIN OF BACILLUS CEREUS INTO TWO COMPONENTS AND NON-IDENTITY OF THE TOXIN WITH PHOSPHOLIPASE.
by Dorothy M. Molnar. 29 Jan 62, 7p

Descriptors: (*Bacillus cereus, Toxins + antitoxins), Culture media, Immune serums, Chromatographic analysis, Inhibition, Tests, Identification, Toxicity.

Bacillus cereus produced toxin in a Casamino acids medium without added serum or other protein. The toxin was separated into two components by adsorption on columns of calcium phosphate gel followed by elution with phosphate buffer (pH 7.5). The component eluted first has been called factor I and the component eluted later factor II. When tested alone each component was relatively nontoxic, but when combined they formed a toxic mixture as evidenced by skin reactions in guinea pigs and tests for lethal effects in mice. The phospholipase activity, determined by the egg-yolk reaction, was found in the fraction containing factor I. However, using columns of alumina-C gamma gel the phospholipase activity was found in the fraction containing factor II. This suggests that the phospholipase is not the same chemical entity as either factor I or II. The following are further evidence for the nonidentity of the toxin and phospholipase: (1) differential precipitation of the two activities by (NH4)2SO4; (2) differential neutralization by various antisera; and (3) differential inhibition with ethanol. (Author)

AD-636 859 **Field 6M, 6O**
Army Biological Labs., Frederick, Md.
THE MECHANISM OF ACTION OF STREPTOMYCIN AS REVEALED BY NORMAL AND ABNORMAL DIVISION IN STREPTOMYCIN-DEPENDENT SALMONELLAE.
by Otto E. Landman, and William Burchard. 12 Dec 61, 10p

Descriptors: (*Streptomycins, *Salmonella), Resistance (Biological), Growth, Culture media, Membranes (Biology), Inhibition.

Under conditions of streptomycin starvation, streptomycin-dependent Salmonellae are inhibited in their ability to form septa and grow out into long filaments. Resupplementation with streptomycin results in synchronous division. If starvation is carried out on soft serum agar in the presence of penicillin, L colonies are formed. These depend on an agar-mediated multiplication process which apparently does not require septation. L forms of the Sd strains can dispense with 95 per cent of the streptomycin supplement required for the growth of the bacillary form. Since most of the streptomycin requirement can thus be eliminated by by-passing septation, it is concluded that the requirement for streptomycin for septation is a primary one. In the Sd strain, streptomycin is required not only to support septation biochemically but also to maintain a heritable system responsible for septation. At low streptomycin levels, 95 per cent of the survivors convert spontaneously to stable L forms, a growth from which transmits the septation disability to its progeny indefinitely. The foregoing results and data from the literature are interpreted in terms of a hypothesis of streptomycin action which states that the site of activity of streptomycin is at the bacillary membrane. (Author)

AD-636 860 **Field 6M**
Army Biological Labs., Frederick, Md.
PESTICINS. II. PRODUCTION OF PESTICIN I AND II.
by Robert R. Brubaker, and Michael J. Surgalla.
23 Apr 62, 7p

Descriptors: (*Germicides, Production), Biological assay, Growth, Inhibition.

Pesticin I was separated from pesticin I inhibitor by ion-exchange chromatography of cell-free culture supernatant fluids and by acid precipitation of soluble preparations obtained from mechanically disrupted cells. The latter procedure resulted in formation of an insoluble pesticin I complex which, upon removal by centrifugation and subsequent dissolution in neutral buffer, exhibited a 100- to 1,000-fold increase in anti-bacterial activity over that originally observed. However, activity returned to the former level upon addition of the acid-soluble fraction, which contained pesticin I inhibitor. Since the presence of pesticin I inhibitor leads to serious errors in the determination of pesticin I an assay medium containing ethylenediaminetetraacetic acid in excess Ca (++) was developed; this medium eliminated the effect of the inhibitor. By use of the above medium, sufficient pesticin I was found to be contained within 500 nonirradiated cells to inhibit growth of a suitable indicator strain; at least 10 to the 7th power cells were required to effect a corresponding inhibition by pesticin II. Although both pesticins are located primarily within the cell during growth, pesticin I may arise extracellularly during storage of static cells. Slightly higher activity of pesticin I inhibitor was found in culture supernatant fluids than occurred in corresponding cell extracts of equal volume. The differences and similarities between pesticin I and some known bacteriocins are discussed. (Author)

AD-636 865 **Field 6M, 6E**
Army Biological Labs., Frederick, Md.
IMMUNIZATION OF MICE AGAINST COCCIDIOIDOMYCOSIS.
by J. L. Converse, M. W. Castleberry, A. R. Besemer, and E. M. Snyder. 10 Jan 62, 8p

Descriptors: (*Coccidioides, Immunity), Spores, Lungs, Brain, Culture media, Mortality rates, Pathology, Vaccines, Viability, Biology assay, Mice.

The observed lower virulence of Coccidioides immitis arthrospores of the M-11 strain compared with the Cash strain was ascribed to the lower ability of the M-11 spores to invade the lungs and brain. Endospores of strain M-11, grown in synthetic medium, were equally as virulent by the intraperitoneal route as arthrospores of strain Cash. Immunization of mice with viable strain M-11 arthrospores protected approximately 50% of the animals against challenge with strain Cash arthrospores. This was evidenced by lower mortality over a 5-month period and lack of gross pathological lesions in killed animals. Although fewer lesions resulted after the use of a viable vaccine, higher survival was obtained with formaldehyde-killed arthrospores. Either preparation tended to confine the infection to the peritoneal cavity. (Author)

AD-636 866 **Field 6M, 6A**
Army Biological Labs., Frederick, Md.
GLUCONATE METABOLISM OF PASTEURELLA PESTIS.
by Robert P. Mortlock. 10 Jan 62, 7p

Descriptors: (*Pasteurella pestis, Metabolism), Enzymes, Degradation, Oxidoreductases, Saccharide phosphates, Dehydration.

During a study of gluconate metabolism by a virulent strain of Pasteurella pestis, evidence was obtained for the presence of gluconokinase, 6-phosphogluconate dehydrogenase, transketolase, and 2-keto-3-deoxy-6-phosphogluconate dehydrase in cell-free extracts. A study of the products of 6-phosphogluconate degradation by extracts indicated that 6-phosphogluconate was metabolized by both the 6-phosphogluconate dehydrogenase-transketolase pathway and the Entner-Doudoroff pathway. No evidence could be obtained for the presence of an active glucose-6-phosphate dehydrogenase. (Author)

AD-636 867 **Field 6M, 6L**
Army Biological Labs., Frederick, Md.
USE OF THE REPLICA-PLATE TECHNIQUE IN STUDIES OF TOXICITY OF METALS AND PLASTICS TO BACTERIA.
by A. J. Rosenwald, H. M. Hodge, S. N. Metcalfe Jr, and R. S. Hutton. 8 Feb 62, 3p

Descriptors: (*Bacteria, Toxic tolerances), Culture media, Laboratory equipment, Metals, Plastics, Adaptation (Physiology), Genetics, Viability, Inhibition, Test methods, Pasteurella tularensis.

A study was made on the efficacy of commonly used test methods to provide useful data concerning toxicity of construction materials to bacteria. Tests such as growth and storage of liquid cultures, which are based on plate counts, appeared to be less efficient in providing interpretable data than were tests which used solid media. The conjunctive use of zone inhibition and an adaptation of the replica-plate technique used in bacterial genetics supplied as much information as other tests, but these solid-media tests were easier to perform, accommodated more test samples per unit of bacterial culture, and the data were more easily understood. (Author)

AD-636 870 **Field 6M**
Army Biological Labs., Frederick, Md.
GENOTYPIC ALTERATIONS ASSOCIATED WITH AVIRULENCE IN STREPTOMYCIN-RESISTANT PASTEURELLA PESTIS.
by Robert R. Brubaker, and Michael J. Surgalla.
16 Apr 62, 10p

Descriptors: (*Pasteurella pestis, Streptomycins), (*Resistance (Biological), Pasteurella pestis), (*Genetics, Pasteurella pestis), Viability, Calcium, Antigens + antibodies, Culture media, Growth, Sensitivity.

Avirulence in Pasteurella pestis, as indicated by the existence of a new genotype, was associated with the genetic loss of Ca(++) dependence rather than with the usual concomitant loss of ability to produce virulence antigens. Strains of the new type exhibited all four of the known virulence factors of P. pestis but were avirulent for mice and guinea pigs. In addition to producing virulence antigens, the new strains formed rough colonies at 37 C when grown on Ca (++) deficient medium, as opposed to typical avirulent strains which formed smooth colonies on this medium and failed to produce virulence antigens. Growth of the new strains in a corresponding Ca (++)-deficient broth medium was slow, as compared with that of typical avirulent strains, but was more rapid than that of virulent strains. The new strains were obtained (1) at 26 C by selecting for resistance to streptomycin or (2) at 37 C by isolation from rough colonies growing on a Ca (++)-deficient agar medium plated with either a virulent streptomycin-sensitive of-resistant culture. Usually, isolates obtained at 26 C exhibited a marked reduction in ability to form colonies upon primary plating at 37 C. Of 108 streptomycin-resistant isolates obtained from six virulent strains, 20% were of the new type. In addition, five isolates were of reduced virulence, but differed in being Ca ++-dependent; they possessed all of the known virulence properties. (Author)

AD-636 874 **Field 6M**
Army Biological Labs., Frederick, Md.
COMPARATIVE STUDIES OF THE MULTIPLICATION OF ANTIGENICALLY RELATED POXVIRUSES ON THE CHORIOALLANTOIC MEMBRANE OF THE CHICK EMBRYO.
by Nicholas Hahon, and James J. Friel. 1 Nov 61, 7p

Descriptors: (*Pox viruses, Growth), Embryonated egg techniques, Variola virus, Vaccinia virus, Antigens + antigens, Thermal stability, Embryos, Chickens.

Identifiers: Alastrim virus, Cowpox virus, Rabbitpox virus, Monkeypox virus.

A comparison was made of the general growth curves of several poxviruses, variola, alastrim, vaccinia, cowpox, rabbitpox, and monkeypox, on the chorioallantoic membrane of the chick embryo. All curves showed a lag period, followed by a tenfold increase of infectivity each 5 hr for approximately 20 to 25 hr, a peak growth level at 48 to 52 hr (except monkeypox), and a gradual decline after 72 hr. Closer examination of the lag period revealed a rapid decline of virus infectivity within 2 to 4 hr after inoculation and the manifestation of an eclipse phase for 4 and 6 hr with all poxviruses. The lag period was terminated with the detection of intracellular virus at 8 to 12 hr, followed by the appearance of extracellular virus 2 to 6 hr later. The proportion of extracellular to intracellular virus was 0.1 or less throughout the different stages of poxvirus growth. In contrast to findings with the other poxviruses, however, extracellular virus equaled or exceeded the quantity of intracellular virus during the latter stages of the growth curves of variola and alastrim viruses. (Author)

AD-636 875 **Field 6M**
Army Biological Labs., Frederick, Md.
SELECTION OF THERMOSTABLE SERRATIA MARCESCENS FROM LOGARITHMIC-PHASE CULTURES AS A MEANS FOR INDUCING SYNCHRONOUS GROWTH.
by George E. Hess, and Milton Shon. 25 Oct 61, 4p

Descriptors: (*Serratia marcescens, Growth), Thermal stability, Culture media, Heat tolerance, Viability.

A relatively thermostable, apparently nonmultiplying, population of Serratia marcescens was found in cultures in the exponential phase of growth. Thermal treatment of the whole culture resulted in the death of the multiplying cell fraction, although the nonmultiplying fraction remained viable. Subcultivation of the thermally treated suspensions yielded cultures in which most of the viable organisms multiplied synchronously for at least two generations. (Author)

AD-636 876 **Field 6M**
Army Biological Labs., Frederick, Md.
RELATIVE HUMIDITY AND THE KILLING OF BACTERIA: THE VARIATION OF CELLULAR WATER CONTENT WITH EXTERNAL RELATIVE HUMIDITY OR OSMOLALITY.
by J. B. Bateman, C. L. Stevens, W. B. Mercer, and E. L. Carstensen. 9 Oct 61, 13p

Descriptors: (*Serratia marcescens, Humidity), Water, Osmosis, Sorption, Thermodynamics, Dehydration, Adsorption, Polymerization, Viability, Equations.

The paper deals with the relationship between the water content of washed Serratia marcescens and the thermodynamic activity of water a sub w over the range $0 < a_w < 1.0$. Two overlapping types of measurement are used: osmotic water exchange and water-vapour sorption. The data are given in terms of the equation $w = Bm^{-r}$ where w is water content, m is external osmolality (actual or effective, depending upon the technique used), B is a constant and r has values which can be interpreted in terms of the type of process involved: e.g. in the initial stages of osmotic dehydration, r of unity would indicate ideal solution behaviour; in the final stages of drying, andy constant value of r would conform to an adsorption function like that of Halsey (1948). The data obtained by the two techniques used fall on a single curve with several zones including (a) non-ideal solution beha-

viour at high a sub w, (b) two intersecting 'co-operative adsorption' zones at very low a sub w and (c) a region of variable r where processes such as dissolution of small molecules and 'saturated' swelling of interlinked polymeric structures are presumed to occur. It is thought that detailed interpretation of the unified water uptake curves would be valuable in understanding mechanisms of humidity-dependent loss of viability, in particular the zones of exceptionally rapid attenuation. (Author)

AD-636 877 **Field 6M**
Army Biological Labs., Frederick, Md.
LYSOGENY AND TOXINOGENY IN BACILLUS CEREUS.
by Robert A. Altenbern. 8 Aug 62, 4p

Descriptors: (*Bacillus cereus, Toxicity), Enzymes, Toxins + antitoxins, Bacteriophages, Culture media, Amino acids, Phosphoric monoester hydrolases, Edema.

Identifiers: Lysis.

For abstract, see T 66 18.

AD-636 879 **Field 6M**
Army Biological Labs., Frederick, Md.
NEW USES FOR MEMBRANE FILTERS. II. ISOLATION OF AUXOTROPHIC MUTANTS.
by Thomas S. Matney, and Eugene P. Goldschmidt. 21 May 62, 1p

Descriptors: (*Membranes, *Filters (Fluid)), (*Bacteria, Filters (Fluid)), Mutations, Metabolism, Selection.

The advantages of using solid media throughout the penicillin procedure for the selection of many auxotrophic (i.e., nutritionally deficient) bacterial mutants of discrete mutational origin were pointed out by Adelberg and Myers (J. Bacteriol. 65:348, 1953). The present report describes a simplified procedure which achieves the same objectives by using membrane filters.

AD-636 880 **Field 6M**
Army Biological Labs., Frederick, Md.
NEW USES FOR MEMBRANE FILTERS. III. BACTERIAL MATING PROCEDURE.
by Thomas S. Matney, and Neil E. Achenbach. 21 May 62, 1p
See also AD-636 879.

Descriptors: (*Membranes, *Filters (Fluid)), (*Bacteria, Filters (Fluid)), Escherichia coli, Reproduction (Physiology), Genetics, Chromosomes, Selection.

A procedure was developed in which Escherichia coli K-12 donor (HFr) and recipient (F-) bacteria are permitted to conjugate on the surface of membrane filters. The rapid separation of conjugal pairs encountered in broth matings is virtually eliminated, since the cells are positionally fixed during the mating process.

AD-636 881 **Field 6M, 15B**
Army Biological Labs., Frederick, Md.
EFFECT OF GLUCOSE CONCENTRATION IN THE GROWTH MEDIUM ON SOME METABOLIC ACTIVITIES OF LISTERIA MONOCYTOGENES.
by Mischa E. Friedman, and Warren L. Alm. 5 Feb 62, 2p

Descriptors: (*Listeria monocytogenes, *Culture media), (*Glucose, Culture media), (*Bacteria, Metabolism), Growth, Oxidation, Catalase, Oxidoreductases, Bacterial aerosols, Viability.

Studies on glucose concentration and metabolic activities of Listeria confirmed the relationship between glucose and oxidative activity. The question of whether the oxidative abilities of some pathogenic bacteria may be related to their virulence is discussed. Increased glucose concentration also was associated with a decrease in catalase activity.

AD-636 882 **Field 6M**
Army Biological Labs., Frederick, Md.
RAPID LETHAL EFFECT IN RATS OF A THIRD COMPONENT FOUND UPON FRACTIONATING THE TOXIN OF BACILLUS ANTHRACIS.
by Francis A. Beall, Martha J. Taylor, and Curtis B. Thorne. 22 Dec 61, 8p

Descriptors: (*Bacillus anthracis, *Toxins + antitoxins), (*Bacterial extracts, Toxicity), (*Rats, Poisoning), Mortality Rates, Lethal dosage, Antigens + antibodies, Biological assay, Mice, Guinea pigs.

Rats were found to be more susceptible to the lethal effect of toxin produced by Bacillus anthracis in vitro than were several species considered less resistant to anthrax. Rats were killed much faster by less toxin per gram of body weight than were mice. Guinea pigs survived doses of toxin that killed rats. Intravenous injection of Fischer 344 rats is a rapid test for lethal activity, which facilitates the demonstration of two components, different from protective antigen, in toxin. One of these, a lethal factor, was separated from the other component, which causes cutaneous edema in the guinea pig. The latter component was not necessary for lethal effect. Neither of these factors was active unless combined with protective antigen. Although the guinea pig skin reaction has been used routinely to assay the toxicity of samples, the present results show that this test does not assay the lethal component. (Author)

AD-636 883 **Field 6M**
Army Biological Labs., Frederick, Md.
OXIDATIVE METABOLISM OF PASTEURELLA PESTIS GROWN IN VITRO AND IN VIVO.
by G. M. Fukui, E. A. Delwiche, R. P. Mortlock, and M. J. Surgalla. 9 Oct 61, 4p

Descriptors: (*Pasteurella pestis, Metabolism), Growth, In vivo analysis, in vitro analysis, Pathology, Etiology, Oxidation, Mycobacterium.

The oxidative metabolism of virulent and avirulent strains of Pasteurella pestis grown in vitro at 26 C and 37 C with various substrates was compared to that of the virulent strain grown in vivo. The results of these studies indicated no significant differences which might correlate with the differences in pathogenicity. Cells grown in vivo were found to acquire the ability to oxidize gluconate. This ability may be of significance in the synthesis of virulence factors. Also, in contrast to the poor oxidative activities of Mycobacterium tuberculosis and M. lepraemurium grown in vivo, P. pestis grown in vivo demonstrated active oxidative ability, although in some cases it was somewhat reduced. (Author)

AD-636 884 **Field 6M**
Army Biological Labs., Frederick, Md.
PYRUVATE OXIDATION BY PASTEURELLA TULARENSIS STRAINS OF GRADED VIRULENCE.
by I. Weinstein, M. L. Guss, and R. A. Altenbern. 17 Nov 61, 8p

Descriptors: (*Pasteurella tularensis, Pyruvates), (*Pyruvates, Oxidation), Carboxylic acids, Enzymes, Metabolism, Antigens + antibodies, Biosynthesis.

The rate of oxidation of sodium pyruvate by Pasteurella tularensis was shown to be correlated with the virulence of the strain studied. No qualitative differences in cofactor requirements for or products of pyruvate oxidation were found among strains of graded virulence. The rate of pyruvate oxidation was directly related to strain virulence, whereas the endogenous respiration rate was inversely correlated with virulence. For all tested strains possessing some degree of virulence, maximal rates of pyruvate oxidation were obtained with small concentrations of pyruvate (10 to 20 micromoles), above which the oxidation rate was depressed. Small concentrations of glutamate or other dicarboxylic acids effected nonadditive stimulation (sparking) of the pyruvate oxidation rate only at pyruvate concentrations above optimal (greater than 20 micromoles). The avirulent strain 38A was unique, being characterized by a low endogenous respiration rate, a maximal rate of pyruvate oxidation at all concentrations above 20 micromoles, and the absence of glutamata sparking. Studies of cell-free extracts indicated that the differences in pyruvate oxidation among the strains may be attributed in part to variation in the properties of enzymes of the tricarboxylic acid cycle. (Author)

AD-636 886 **Field 6M**
Army Biological Labs., Frederick, Md.
NUTRITION OF LEPTOSPIRA POMONA. I. A CHEMICALLY DEFINED SUBSTITUE FOR RABBIT SERUM ULTRAFILTRATE.
by R. C. Johnson, and N. D. Gary. 7 Oct 61, 5p

Descriptors: (*Leptospira, Growth), Culture media, Rabbits, Blood serum, Nutrition, Amino acids, Thiamines.

Poor growth of Leptospira pomona, strain Wickard, in a medium containing exhaustively dialyzed rabbit serum was corrected by addition of rabbit serum ultrafiltrate. A dialyzed serum medium was used to investigate the nutritional qualities of various compounds when tested as stubstitues for the ultrafiltrate fraction. L-Asparagine was the only amino acid that makedly stimulated growth. L-Glutamine was active only when autoclaved (converted to the ammonium salt of pyrrolidone carboxylic acid), and NH4Cl and urea satisfactorily replaced L-asparagine. Results indicated that amino acids functioned primarily as a nitrogen source in this medium. Thiaine was the only vitamin required for growth. The lag phase was usually decreased by 1 day with Na HCO3. A medium composed of 0.02M phospate buffer (pH 7.4), 15% dialyzed rabbit serum, thiamine (5 micrograms/ml), and NH4Cl (.001 M) supported growth equivalent to that obtained with undialyzed rabbit serum medium. L. pomona was transferred six times, in this medium and seven other serotypes were transferred three times, without any decrease in amount of growth. Growth of L. pomona was initiated with 20 organisms per ml. (Author)

AD-636 887 **Field 6M**
Army Biological Labs ., Frederick, Md.
MORPHOLOGIC AND IMMUNOHISTOCHEMICAL STUDIES OF THE PATHOGENESIS OF INFECTION AND ANTIBODY FORMATION SUBSEQUENT TO VACCINATION OF MACACA IRUS WITH AN ATTENUATED STRAIN OF PASTEURELLA TULARENSIS. II. AEROGENIC VACCINATION.
by John D. White, Malcolm H. McGavran, Patricia A. Prickett, Jerry J. Tulis, and Henry T. Eigelsbach. 12 Mar 62, 9p
Original contains color, reproductions in black/white only.

Descriptors: (*Pasteurella tularensis, Vaccines), (*Immunity, Pasteurella tularensis), Bacterial aerosols, Morphology (Biology), Histology, Pathology, Infections, Dosage, Viability, Respiratory system, Antigens + antibodies, Monkeys.

Twenth-four cynomolgus monkeys were vaccinated aerogenically with the living vaccine strain (LVS) of P. tularensis. The average inhaled dose was 270,000 viable cells. The bacteria initiated a mild, nongranulomatous inflammatory response in the respiratory bronchioles that was completely resolved by the 14th day after vaccination. LVS disseminated to involve the intrapulmonic lymphoid tissues, the tracheobronchial lymph nodes, the liver and the spleen. By the 28th day all sites except the tracheobronchial lymph nodes were sterile, and no bacteria were recovered from these

nodes on the 90th day. Anti-tularensis gamma globulin (ATGG) appeared in plasma cell precursors in the lung, about respiratory bronchioles, and in the peribronchial lymphoid tissues by the seventh day. By the 14th day mature plasma cells containing ATGG were prominent. The appearance of ATGG in the regional lymph nodes and spleen was as prompt as that found in the dermal vaccinees. (Author)

AD-636 888 **Field 6M**
Army Biological Labs., Frederick, Md.
TRANSDUCTION BY ULTRAVIOLET-IRRADIATED VIRULENT BACTERIOPHAGE.
by Eugene P. Goldschmidt, and Otto E. Landman.
18 Sep 61, 2p
Prepared in cooperation with Texas Univ., Austin. Dept. of Microbiology.

Descriptors: (*Genetics, Bacteriophages), (*Bacteriophages, Ultraviolet radiation), Culture media, Mutations, Salmonella, Pasteurella pestis, Escherichia coli.

For abstract, see T 66 18.

AD-636 889 **Field 6M**
Army Biological Labs., Frederick, Md.
EFFECT OF NUTRITION ON THE RESPIRATORY VIRULENCE OF LISTERIA MONOCYTOGENES.
by Mischa E. Friedman, and Donald A. Kautter.
28 Jul 61, 7p

Descriptors: (*Listeria monocytogenes, Culture media), Respiration, Viability, Oxidation, Growth, Glucose, Nutrition, Oxidoreductases.

The respiratory virulence for the mouse and guinea pig of two strains of Listeria monocytogenes grown in a rich nonsynthetic medium may be increased four to ninefold by decreasing the glucose concentration from 1.0 to 0.6% or by including 0.1% L-cysteine in the medium. This effect, not observed in intraperitoneal challenge of mice, is not due to selection of a more virulent population. Cultures demonstrating lowered virulence at 16 hr increase in virulence if incubated beyond 50 hr. The presence of 1.0% fructose or cellobiose results in the same growth and virulence characteristics as when glucose is used; however, cultures in media with 1.0% maltose are of decreased cell yield but increased virulence. Strain A4413 grown in media of low glucose concentration or in the presence of cysteine has greater oxidative activity than when grown in a medium of high glucose content. Other strains of lesser respiratory virulence, when grown in a low concentration of glucose, contain glucose dehydrogenase systems equal in activity with that of strain A4413. (Author)

AD-636 890 **Field 6M, 6E**
Army Biological Labs., Frederick, Md.
DIFFERENCES AMONG VIRUS POPULATIONS RECOVERED FROM MICE VACCINATED WITH AN ATTENUATED STRAIN OF VENEZUELAN EQUINE ENCEPHALOMYLETIS VIRUS.
by Henry J. Hearn Jr. 17 Feb 61, 5p

Descriptors: (*Venezuelan equine encephalomyelitis virus, Vaccines), Immunity, Spleen, Liver, Brain, Mice, Recovery.

The differences among virus populations that were recovered after the vaccination of mice with an attenuated strain of Venezuelan equine encephalomyelitis virus were investigated. Large quantities of virus were recovered from spleen and liver tissues; smaller amounts were isolated from the brain. During the first 24 hr, virus populations recovered from all three tissues contained a majority of nonlethal, immunizing particles which gave higher titers in L cells than in mice. Such virus preparations resembled the attenuated vaccine virus strain with respect to the degree of virulence for mice and in the small size of the plaques produced on chick fibroblasts. At 72 hr, virus particles lethal for mice by the intraperitoneal (i.p.) route appeared in spleen tissue and a small percentage of plaques, larger in size than those produced by the attenuated strain were found. Such virus populations, therefore, showed properties similar to those shown by the virulent parent virus from which the attenuated strain was derived. In contrast, liver and brain tissue taken from vaccinated mice yielded only virus which was nonlethal when tested i.p. and which produced only small plaques. Despite the presence of virulent virus in spleen demonstrable after subinoculation, no signs of clinical illness were observed in any of the vaccinated mice. (Author)

AD-636 891 **Field 6M**
Army Biological Labs., Frederick, Md.
RELATIVE HUMIDITY AND THE KILLING OF BACTERIA. THE SURVIVAL OF DAMP SERRATIA MARCESCENS IN AIR.
by J. B. Bateman, Patricia A. McCaffrey, R. J. O'Connor, and G. W. Monk. 10 May 61, 5p

Descriptors: (*Serratia marcescens, Humidity), Viability, Air, Water, Storage, Freeze drying, Vacuum, Thermodynamics, Stability, Aerosols.

The viability of washed moist cells of Serratia marcescens after storage has been measured in relation to variations in the prior treatment of the cells and in conditions of storage. The factors considered were: (1) water content during storage; (2) method of arriving at water content (partial drying in vacuum or freeze-drying and addition of water); (3) presence or absence of air during storage. Increasingly rapid decay occurs as the water content at which the cells are stored is diminished from above 90% to 20 or 30% ('critical' water content). It occurs in presence or absence of air and it occurs whether the final water content is approached by removal of water from wet cells or by addition of water to freeze-dried cells. The rate of decay during storage at 20 to 30% water is somewhat diminished by the presence of air ('protective' effect of air). As the water content is further reduced to less than 10%, the stability of cells stored in a vacuum approaches that of wet cells. In presence of air the reverse is true: the stability decreases until at less than 1% water, the decay rate is about as great as at the 'critical' water content ('toxic' effect of air). Particularly rapid decay of S. marcescens at the 'critical' water content has escaped attention in aerosol studies because accurate control of relative humidity (RH) in this region, RH 94 to 99%, is virtually impossible in such studies. On the other hand, values of decay rates referred to measured water contents are quite unreliable in the 20 to 80% RH zone because the corresponding variation of water content is too small to measure reliably. (Author)

AD-636 894 **Field 6M**
Army Biological Labs., Frederick, Md.
OXIDATION OF METADIHYDROXYPHENOLS BY ENZYMES OF PIRICULARIA ORYZAE.
by David Stefanye. 17 Apr 61, 2p

Descriptors: (*Piricularia, Enzymes), (*Phenols, Oxidation), Oxygen consumption.

For abstract, see T 66 18.

AD-636 897 **Field 6M**
Army Biological Labs., Frederick, Md.
SOME RECOMBINATION ANOMALIES OF THE HIGH-LEVEL STREPTOMYCIN-RESISTANT LOCUS.
by Thomas S. Matney, William C. McDonald, and Eugene P. Goldschmidt. 30 Dec 61, 2p

Descriptors: (*Resistance (Biological), Genetics), (*Streptomycins, Resistance (Biological)), Chromosomes, Bacteria, Sensitivity, Anomalies.

For abstract, see T 66 18.

AD-636 898 **Field 6M, 6L**
Army Biological Labs., Frederick, Md.
THE PARTICHROME ANALYZER FOR THE DETECTION AND ENUMERATION OF BACTERIA.
by Sol S. Nelson, Orvil E. A. Boldvan, and William A. Shurcliff. 1962, 9p
Prepared in cooperation with Polaroid Corp., Cambridge, Mass.

Descriptors: (*Bacterial aerosols, Counting methods), Sampling, Particles, Colors, Laboratory equipment, Automation.

The problem of detecting and counting aerosolized bacteria has been approached in several ways. One of the simplest methods is to collect a sample and examine it microscopically, using a standard bacteriological stain. The automation of such a device requires a processing system to collect and stain the sample and a scanner to recognize the stained organism against a background of unstained particles. The instrument reported here differs from previously described devices for scanning microscopic fields in that instead of responding to particle size or total numbers it responds to color. (Author)

AD-636 899 **Field 6M**
Army Biological Labs., Frederick, Md.
THE ROLE OF FOLIC ACID IN THE METABOLISM OF MEMBERS OF THE PSITTACOSIS GROUP OF MICROORGANISMS.
by Julio I. Colon. 1962, 13p
Prepared in cooperation with Chicago Univ., Ill., Dept. of Microbiology. Grant PHS-E-1594.

Descriptors: (*Miyagawanella, Metabolism), Folic acid, Biosynthesis, Enzymes.

Identifiers: Psittacosis-lymphogranuloma venereum-trachoma.

For abstract, see T 66 18.

AD-636 902 **Field 6M, 6L**
Army Biological Labs., Frederick, Md.
INFECTIOUS BACTERIAL AEROSOL FROM DROPPED PETRI DISH CULTURES.
by M. S. Barbeito, R. L. Alg, and A. G. Wedum.
30 Jun 61, 5p

Descriptors: (*Biological laboratories, Accidents), (*Biological contamination, Accidents), Infections, Medical technicians, Culture media, Diseases, Bacterial aerosols, Hazards, Pasteurella tularensis, Serratis marcescens.

For abstract, see T 66 18.

AD-636 904 **Field 6M**
Army Biological Labs., Frederick, Md.
PESTICINS. I. PESTICIN-BACTERIUM INTERRELATIONSHIPS, AND ENVIRONMENTAL FACTORS INFLUENCING ACTIVITY.
by Robert R. Brubaker, and Michael J. Surgalla.
27 Jun 61, 11p

Descriptors: (*Germicides, Pasteurella), (*Pasteurella, Inhibition), Pasteurella pestis, Pasteurella pseudotuberculosis, Escherichia coli, Growth, Mutations, Genetics, Culture media.

A second bacteriocin-like substance produced by all tested strains of Pasteurella pestis and P. pseudotuberculosis is described. This activity, termed pesticin II, is active against the two avirulent P. pestis strains, A12 and Java. These strains do not produce pesticin I, which inhibits the growth of type I strains of P. pseudotuberculosis. Pesticin I was also found to be active against certain strains of Escherichia coli, strain A12, but not strain Java, and some P. pestis isolates which also produce pesticin I. A number of E. coli strains produce a substance which also inhibits the growth of strains A12 and Java; the activity of this substance is de-

pendent upon the presence of high concentrations of Ca (++). The activity of both pesticins is inhibited under anaerobic conditions or in the presence of antiserum. The activity of pesticin I, but not pesticin II, is suppressed by Fe (+++), hemin, certain hemin-containing proteins, Mg(++), and inorganic phosphate. Suppression of pesticin I activity by Fe (+++) can be reversed by the addition of either Ca(++) or Sr(++) or by metal chelating agents. All tested strains of P. pestis and P. pseudotuberculosis produce a metabolite which suppresses the activity of pesticin I. The activity of this substance, termed pesticin I inhibitor, is enhanced by Fe (+++), and to a lesser extent by Mg (++) or by inorganic phosphate; its activity is suppressed by Mn (++) and by protamine sulfate. (Author)

AD-636 906 **Field 6M**
Chicago Univ., Ill.
A COMPARATIVE STUDY OF THE GROWTH CYCLES OF DIFFERENT MEMBERS OF THE PSITTACOSIS GROUP IN DIFFERENT HOST CELLS.
by Jack Litwin, Julius E. Officer, Arthur Brown, and James W. Moulder. 25 Apr 61, 29p
Grant PHS-E-1594
Prepared in cooperation with Army Biological Labs., Frederick, Md.

Descriptors: (*Miyagawanella, Growth), Miyagawanella psittaci, Miyagawanella louisianae, Mutations, Tissue culture, Embryonated egg technique, Morphology (Biology), Electron microscopy, Cell division.

In a comparative study of the growth cycle of the psittacosis group of microorganisms, meningopneumonitis virus, the Borg strain of psittacosis virus, the 6BC strain of psittacosis virus, and a mutant of the 6BC strain adapted to growth in Chang's human liver cells were propagated in this human cell line and in the chorioallantoic ectoderm of chick embryos. All 4 agents multiplied readily in the chorioallantoic ectoderm but they showed widely varying abilities to invade and multiply in Chang's human liver cells. During the relatively synchronous first cycle of growth in both hosts, closely spaced observations were made of infectivity (yolk sac LD50), total particle count, particle distribution (relative proportion of different particle types), and morphology in thin sections examined with the electron microscope. The growth cycles in all 8 host-parasite systems were very similar. The multiplying forms were large reticulated particles of low infectivity for fresh cells which eventually differentiated into small dense-centered particles which multiplied no further but were highly infectious for new host cells. (Author)

AD-636 907 **Field 6M, 6E**
Army Biological Labs., Frederick, Md.
ROLE OF THE CAPSULE OF PASTEURELLA PESTIS IN BUBONIC PLAGUE IN THE GUINEA PIG.
by J. E. Donavan, D. Ham, G. M. Fukui, and M. J. Surgalla. 13 Feb 61, 4p

Descriptors: (*Pasteurella pestis, Viability), (*Guinea pigs, Infections), Cell structure, Lethal dosage, Genetics, Mutations, Diseases, Pasteurella.

Identifiers: Bubonic plague.

Fully virulent encapsulated plague bacilli established infection in the guinea pig after intradermal doses approaching a single bacterium; all infections were lethal. Genetic loss of ability to form capsular material resulted in essentially no loss of infectivity; however, loss of virulence was considerable. The capsule appears to be much more essential for lethality than for infectivity in the guinea pig. (Author)

AD-636 946 **Field 6M**
CFSTI Prices: HC$7.00 MF$1.75
Fairchild Hiller Corp., Farmingdale, N. Y. Republic Aviation Div.
DETERMINATION OF THE INDIGENOUS MICROFLORA OF MEN IN CONTROLLED ENVIRONMENTS.
Final rept. Jul 64-Nov 65.
by Phyllis E. Riely, Donna Geib, and Diane Shorenstein. Apr 66, 387p
Contract AF 33 (615)-1814
Proj. AF-7164
Task 716405
AMRL-TR-66-33

Descriptors: (*Bacteria, Environment), (*Space environmental conditions, Hygiene), Controlled atmospheres, Determination, Skin, Degradation, Space medicine, Diet, Humans.

The objective of the study was to collect, under controlled conditions simulating space travel, microbiological data from 13 body areas of 20 subjects and their specialized environment. These data were evaluated to establish biomedical criteria for personal hygiene and sanitation for aerospace missions, and to suggest possible indices of the deterioration of environmental conditions. Data derived in the study provided information on microbial dynamics, the effects of confinement stress on the microbiological populations of individuals, and information on bacterial levels in the closed environment. The study strengthened the evidence that, in general, man can go without bathing for 6 weeks without significant deterioration of the dermis. It pointed out the importance of sampling the groin and glans penis as 'indicator' areas which quickly signal deterioration in hygienic standards. The specific buildup of both corynebacteria and micrococcaceae species in almost all sampled body sites was significant. Another objective of the program was to study the effects of the various space-type diets on the fecal flora of the subjects. The data revealed that although the obligately anaerobic character of the feces remained unchanged, the types of anaerobes recovered differed markedly from those found to be predominant in the 'normal' population. The shift in the types of anaerobic bacteria is discussed from the viewpoints of vitamin production, lactic acid production, and deaminating and decarboxylating activities. (Author)

N66-17088 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Fort Detrick, Md. Physical Defense Div.
A STUDY OF DRY HEAT STERILIZATION OF MICROORGANISMS AT 105 DEG C.
by D. M. Portner. 26 Jan 66, 14p Test no. 6-66
Contract NASA-Order-R-35
NASA-CR-70321

Descriptors: *Microorganism, *Dry heat, *Spacecraft sterilization.

For abstract, see T 66 18.

N66-17240 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
MICROBIAL CONTAMINATION OF A SURFACE BY HANDLING.
by E. M. Powers. Nov 65, 12p NASA-TM-X-55408, X-624-65-491

Descriptors: *Handling, *Contamination, *Microorganism, *Personnel, *Stainless steel.

PB-170 677 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Kansas Univ., Kansas City. Medical Center.
PRODUCTION, STANDARDIZATION AND PACKAGING OF SEED VIRUSES AND 'MONOTYPIC' MOUSE ASCITES FLUID AND SERUM ANTIBODIES FOR 3 ARBOVIRUSES.
Semiannual progress rept. for 1 Sep 65-1 Mar 66.
by Herbert A. Wenner. 1 Mar 66, 11p
Contract PH43-64-1155

Descriptors: (*Arboviruses, Immune serums), Antigens + antibodies, Body fluids, Mice, Production, Standardization, Packaging, Storage, Viability, Immunity, Serodiagnosis, Test methods.

Serologic studies of mice whose newborns were used for the preparation of Turlock and SSF agent virus pools indicate freedom from GD VII, Reo 3, Polyoma, Sendai, PVM and K antibodies. The required quantities of agent virus pools (immunizing agents and certified seeds) for California, SSF and Turlock viruses have been prepared, titrated and certified using reference antisera. Production and collection of virus immune ascitic fluid and serum have been completed for California virus. The ascitic fluid (11 bottles) and serum (6 bottles) are stored at-20C. The HI and CF titers of these fractions have been determined. Most of the fractions had satisfactory titers. The potency and purity tests on the same fractions are either completed or currently in progress. Production of SSF immune ascitic fluid and serum was started on 2/28/66. The effect of storage of lyophilized virus stocks at 22C, 4C and -20C was studied. Only stocks stored at -20C showed no loss of titer up to 90 days. (Author)

AD-636 444 See Field 6E
AD-636 476 See Field 6E
AD-636 477 See Field 6E
AD-636 618 See Field 6E
AD-636 691 See Field 6C
AD-636 707 See Field 6A
AD-636 711 See Field 2E
AD-636 779 See Field 6A
AD-636 813 See Field 6E
AD-636 814 See Field 6E
AD-636 815 See Field 6E
AD-636 817 See Field 6E
AD-636 818 See Field 6E
AD-636 846 See Field 6L
AD-636 854 See Field 6E
AD-636 856 See Field 6L
AD-636 869 See Field 6A
AD-636 873 See Field 2E
AD-636 878 See Field 6E
AD-636 892 See Field 6E
AD-636 893 See Field 6E
AD-636 900 See Field 6L
AD-636 901 See Field 2E
AD-636 905 See Field 6C

6N. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

AD-636 638 **Field 6N, 5I**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
ANALYSIS OF REJECTIONS IN EXAMINATIONS FOR SUBMARINE SCHOOL.
Interim rept. no. 5.

by A. T. Malinosky, and N. R. Bartlett. 29 Aug 45, 6p
NAVMED-X-566

Descriptors: (*Submarine personnel, *Medical examination), Analysis, Selection.

Tabulations of failures in examinations for Submarine School are presented. The report shows the number of enlisted men examined and the number rejected for various reasons for each of the past five months; and there is a tabulation for July according to the station supplying these men.

N66-16603 **Field 6N**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE VALIDITY OF A BRIEF VESTIBULAR DISORIENTATION TEST IN SCREENING PILOT TRAINEES.
by R. K. Ambler, and F. E. Guedry Jr. 18 Oct 65, 16p NAMI-947, Rept. no. 122
Contract NASA Order-R-47
NASA-CR-70146

Descriptors: *Motion sickness, *Personnel selection, *Pilot selection, *Vestibular test.

For abstract, see T 66 18.

AD-636 632 **See Field 6P**

AD-636 636 **See Field 6P**

6O. PHARMACOLOGY

AD-636 334 **Field 6O**
CFSTI Prices: HC$1.00 MF$0.50
Texas Univ., Galveston. Dept. of Pharmacology.
POST GANGLIONIC CHOLINERGIC MEDIATION OF SYMPATHETIC NERVES.
Terminal progress rept., 1 May 64-31 May 66.
by James G. Hilton. 31 May 66, 6p
Grants AF-AFOSR-391-63, AF-AFOSR-391-65
Proj. AF-9777
Task 977701
AFOSR-66-1474

Descriptors: (*Autonomic agents, Autonomic nervous system), (*Parasympatholytic agents, Autonomic nervous system), Ganglia, Nerve impulses, Blood vessels, Reflexes, Blood pressure, Atropine, Obstruction (Physiology), Arteries, Vasoactive agents.

Identifiers: Chlorisondamine.

The possible existence of cholinergic postganglionic transmission which is not blocked by classical ganglionic blocking agents but which is sensitive to atropine was investigated. The report outlines the work undertaken and lists publications resulting from the study. (Author)

N66-15975 **Field 6O**
CFSTI Prices: HC$2.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla. Aerospace Medical Inst.
PRACTICAL AND THEORETICAL IMPLICATIONS BASED ON LONG-TERM FOLLOW-UP OF MENIERE'S PATIENTS TREATED WITH STREPTOMYCIN SULFATE.
by A. R. Fregly, A. Graybiel, M. E. McLeod, E. F. Miller II, and H. F. Schuknecht. 25 Oct 65, 30p NAMI-948
Contract NASA Order-R-93
NASA-CR-69658

Descriptors: *Antibiotics, *Disease, *Ear, *Physiological response, *Streptomycin.

For abstract, see T 66 18.

AD-461 388 **See Field 6T**

AD-636 477 **See Field 6E**

AD-636 557 **See Field 7C**

AD-636 580 **See Field 6F**

AD-636 765 **See Field 6E**

AD-636 859 **See Field 6M**

AD-636 878 **See Field 6E**

AD-636 984 **See Field 6E**

AD-637 107 **See Field 6P**

6P. PHYSIOLOGY

AD-459 313 **Field 6P, 6A**
CFSTI Price: HC$2.60
RAND Corp., Santa Monica, Calif.
PHYSIOCHEMICAL CHARACTERISTICS OF PLACENTAL TRANSFER.
Revised ed.
by J. C. DeHaven, E. C. DeLand, N. S. Assali, and W. Manson. 23 Feb 65, 27p P-2565-1

Descriptors: (*Membranes (Biology), Transport properties), (*Physiology, Membranes (Biology)), Embryos, Blood circulation, Mathematical models, Blood vessels, Respiration, Oxygen, Pregnancy, Chemoreceptors, Ions, Hemoglobin, Biochemistry, Respiratory system.

A biophysiocochemical model of certain maternal-fetal circulatory and metabolic relations was constructed for the purpose of simulating the composition and the transfer of respiratory gases and other elements across the placental membrane. The model was subsequently analyzed by a mathematical method for the minimization of a chemical free-energy function subject to constraints relating to mass, charge and phase transfer. Such a model has been used previously for the efficient computation of the steady states of large multi-phase biochemical systems that involve membrane transfer and gradients. As a preliminary investigation of the placental phenomenon, the model was applied to the representation of the exchanges of respiratory gases occurring between the venous and arterial sides of the total air-blood system. Some interestingly close similarities were obtained between the model results and physiological measurements. In addition, the model indicates a greater acidity for the fetal than for the maternal erythrocyte intracellular medium. This feature, combined with other aspects of the results, could explain in part the reported low oxygen saturation of fetal hemoglobin in utero. (Author)

AD-636 312 **Field 6P**
Lyon Univ. (France). Institut de Physiologie.
ETUDE POLYGRAPHIQUE DU SOMMEIL CHEZ L'AGNEAU (Polygraph Study of Sleep in the Lamb).
by M. Jouvet. 1962, 4p
Grant AF-EOAR-62-67
Text in French.

Descriptors: (*Sleep, Electrophysiology), France.

For abstract, see T 66 18.

AD-636 330 **Field 6P**
CFSTI Prices: HC$4.00 MF$0.50
Lyon Univ. (France). Laboratoire de Pathologie Experimentale.
LES MOUVEMENTS OCULAIRES AU COURS DU SOMMEIL PARADOXAL (Movements of the Eye during Paradoxical Sleep).
Doctoral thesis.
by Jacques Mouret. 1964, 114p
Grant AF-EOAR-62-67
Text in French.

Descriptors: (*Sleep, Electrophysiology), (*Eye, Motion), Electroencephalography, Brain, Drugs, Histology, Cats, France.

Identifiers: Paradoxical sleep.

For abstract, see T 66 18.

AD-636 338 **Field 6P, 9B**
CFSTI Prices: HC$1.10 MF$0.50
Brussels Univ. (Belgium). Institut Solvay de Physiologie.
COMPUTER ANALYSIS OF THE ELECTRO-CARDIOGRAM.
Semiannual rept.
by Rijlant Pierre. 1966, 4p
Grant AF-EOAR-61-10

Descriptors: (*Electrocardiography, Mathematical analysis), Computers, Anatomical models, Body, Heart, Dipole moments, Electrophysiology, Magnetic tape, Belgium.

For abstract, see T 66 18.

AD-636 349 **Field 6P**
CFSTI Prices: HC$3.00 MF$0.75
Uppsala Univ. (Sweden). Inst. of Physiology.
RESEARCH ON THE GENESIS OF ACTION POTENTIAL IN EXCITABLE TISSUES.
Technical rept. (final).
by Torsten Teorell. 10 Jun 66, 89p
Grant AF-EOAR-29-65
Proj. AF-9777
Task 977701
AFOSRS-66-1510

Descriptors: (*Neuromuscular transmission, Electrophysiology), Tissues (Biology), Biophysics, Muscles, Heart, Arrhythmia, Dextran, Gels, End organs, Erythrocytes, Hemolysis, Models (Simulations), Sweden.

Identifiers: Ion transport.

The report describes research as follows: Investigations on a biophysical theory of physiological mechanoreceptors; a preliminary biophysical analysis of heart arrhythmias; experiments on the excitability of the living heart; investigations on the transport of ions and molecules in tightly cross-linked dextran gels. (Author)

AD-636 414 **Field 6P, 17H, 20F**
CFSTI Prices: HC$4.00 MF$0.75
Mitre Corp., Bedford, Mass.
DESIGN PROBLEMS IN VISUAL DISPLAYS. PART I. CLASSICAL FACTORS IN THE LEGIBILITY OF NUMERALS AND CAPITAL LETTERS.
by D. Shurtleff. Jun 66, 114p MTR-20
Contract AF 19 (628)-5165
Proj. AF-7030
ESD-TR-66-62

Descriptors: (*Display systems, *Visual perception), (*Graphics, Visual perception), Performance (Human), Visual acuity, Optics, Man-machine systems.

The effects of classical factors, such as symbol geometry, symbol brightness, and brightness contrast, upon the legibility of numerals and capital letters are discussed. The literature of the last few decades is evaluated, and selected studies are reviewed in detail and referenced. Conclusions are drawn, and recommendations are made for display design and application. (Author)

AD-636 475 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Arctic Aeromedical Lab., Fort Wainwright, Alaska.
CARDIOVASCULAR EFFECTS OF MILD SURFACE COOLING.
Final rept., Nov 64-Mar 65.
by Eugene Evonuk. May 66, 16p AAL-TR-66-1
Proj. AF-8237
Task 823701

Descriptors: (*Hypothermia, Blood circulation), (*Acclimatization, Cardiovascular system), Blood transfusions, Dogs, Blood pressure, Pulse rate, Body temperature, Thresholds (Physiology), Tissues (Biology), Metabolism.

Identifiers: Homeokinesis.

The cardiovascular effects in normothermic dogs cross-circulated with mildly hypothermic dogs were studied in animals that were warm and cold acclimatized. By this technique it was possible to physiologically dissect the neural responses from the humoral or metabolic factors involved. The cardiac output, limb blood flow, arterial pressure and heart rate were measured in normothermic dogs at the time of each 0.5C drop in rectal temperature of dogs that were rendered mildly hypothermic by surface cooling, and at each 0.5C increase in rectal temperature during rewarming. Acute surface cooling of warm-acclimatized dogs liberated specific metabolites and/or neurohumors that had a profound cardiovascular effect on cross-circulated normothermic dogs. In similar experiments on cold-acclimatized animals, this effect was not observed. It was concluded that cold acclimatization depleted or shifted the cardiovascular threshold response to these metabolites and/or neurohumors. (Author)

AD-636 632 **Field 6P, 6N, 5J**
CFSTI Prices: HC$5.60 MF$0.50
Naval Medical Research Lab., New London, Conn.
COMPARISON AND EVALUATION OF AMERICAN OPTICAL CO. PSEUDO-ISOCHROMATIC PLATES, FIRST AND SECOND EDITIONS.
Final rept.
by Dean Farnsworth, and J. D. Reed. 19 Mar 45, 54p 55, Color Vision-8
NAVMED-X-480 (Av-255-p)

Descriptors: (*Color vision, Medical examination), Colors, Optics, Standards, Effectiveness, Performance tests.

A group of 510 men was examined on American Optical Company Pseudo-Isochromatic Plates, first and second editions, for the purpose of comparing the two editions especially with respect to their effectiveness in distinguishing between color-normal and color-anomalous individuals. The two editions were shown to be of approximately equal validity in detecting defective color vision. The second edition, even after modification, was found to contain several plates too difficult for normals. When these were corrected, the revised second edition proved to be superior to both the first and second editions in dichotomizing between normal and anomalous color vision. The tests are effective when scored on the basis of the number of plates failed (or passed) out of the total. An interpretation based on the number of plates failed (or passed) in each color group does not effectively segregate the color normal from the color anomalous. The two editions were compared with respect to the time necessary to complete the test, and the difference proved to be negligible. Sixteen men with anomalous color vision attempted to memorize both editions of the plates. The second edition proved increasingly more difficult to memorize as the degree of color deficiency increased. Three severely defective color blinds learned the first edition but were unable to learn the second edition. (Author)

AD-636 636 **Field 6P, 6N**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
THE EFFECT OF INCREASING THE DIFFICULTY OF THE RPA TEST OF NIGHT VISION.
Interval rept. no. 3.
by W. S. Verplanck. 25 Sep 45, 20p 74
NAVMED-X-268 (Av-156-c)

Descriptors: (*Vision, Medical examination), (*Adaptation (Physiology), Vision), Effectivenss, Performance tests, Brightness.

Results obtained on a group of 446 men given both the standard Radium Plaque Adaptometer test and also the same test at a brightness .20 log units lower than the standard, indicate that a much larger percentage of men will necessarily fail the test if the brightness is lowered. Classification based on a more difficult test has the same statistical properties as that based on the regular test, and consequently will doubtless be no more reliable. (Author)

AD-636 641 **Field 6P**
CFSTI Prices: HC$2.60 MF$0.50
Naval Medical Research Lab., New London, Conn.
THE EFFECT OF COLORED LENSES UPON COLOR DISCRIMINATION.
by Dean Farnsworth. 3 Sep 45, 22p 73, Color Vision-9

Descriptors: (*Color vision, Lenses), (*Lenses, Colors), Visual perception, Eyeglasses, Performance (Human).

Six commercial types of sun glass lenses were used in six laboratory tests to determine their effects on color perception, during and immediately after the wearing. Neutrals (types, Neutral and Polaroid) and greenish-gray lenses (types, Rayban and Calobar) produced little distortion of color perception as measured by any test. Brown lenses (type, Rose Smoke) caused considerable decrement in color discrimination and a yellow lens (type, Noviol) caused extreme decrement. None of the lenses increased color perception in any part of the color range. It is concluded that greenish-gray lenses of the Rayban and Calobar type do not seriously impair color perception when used for the observation of non-dichromatic materials. A study was made on the after effects of wearing the lenses: it appears that adaptation proceeds rapidly and is half-completed in about 5 seconds. There are appendices on the measurement of spectral transmittance of polarizing film and on methods of specification of neutrality for sunglasses. (Author)

AD-636 692 **Field 6P**
CFSTI Prices: HC$2.00 MF$0.50
Louvain Univ. (Belgium). Cardiopulmonary Lab.
BEAT TO BEAT REGULATION OF THE PULMONARY CIRCULATION IN CONSCIOUS DOGS. THE EFFECTS OF NORMAL RESPIRATION.
by A. A. Charlier. 30 Nov 64, 41p Scientific-1
Contract AF 61 (052)-738

Descriptors: (*Lungs, *Blood circulation), Respiration, Blood pressure, Aorta, Pulse rate, Arteries, Volume, Dogs, Belgium.

In mongrel dogs, electromagnetic transducers were surgically implanted around the main pulmonary artery and at the root of the aorta. A week after the procedure, the effects of normal respiration on different parameters of the pulmonary circulation were investigated in healthy conscious animals. Mean pulmonary-left atrial pressure gradient (PA-LA), right and left ventricular stroke volume (SV), change in pulmonary-left heart central blood volume (P-LH.CBV) were monitored on a beat to beat basis at different times of the respiratory cycle. PA-LA mean pressure gradients only showed slight variations of .3 to 1.0 cm H20 with minimal values before and around peak inspiration. Right SV always increased during inspiration with maxima around peak inspiration while left SV showed similar variations with maxima occurring between the end of expiration and the inspiratory phase depending on the rate of breathing. P-L H. CBV changes up to 8 ml were observed during the respiratory cycle, their magnitude and exact timing varied with rates and depth of breathing. Beat to beat relationships between mean PA-LA gradient over right SV per second of ejection were used as an index of pulmonary vascular resistance (PVR).

AD-636 693 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Goteborg Univ. (Sweden). Dept. of Physiology.
THE NEUROGENIC CONTROL OF THE CARDIOVASCULAR SYSTEM.
Annual summary rept. no. 2, 1 Oct 64-30 Sep 65.
by Bjorn U. G. Folkow, 1 Oct 65, 23p
Contract AF 61 (052)-732

Descriptors: (*Autonomic nervous system, *Blood circulation), (*Cardiovascular system, Reflexes), Muscles, Gastrointestinal system, Capillaries, Blood vessels, Nerve fibers, Neuromuscular transmission, Hormones, Thalamus, Blood platelets, Pathology, Sweden.

Contents: Muscle circulation: Gastrointestinal circulation and function; Transcapillary exchange; Nervous control of the veins; Release and elimination of the adrenergic vasoconstrictor transmitter; Reflex control of the blood volume; Suprabulbar autonomic centres; Pathophysiological aspects of the cardiovascular system.

AD-636 694 **Field 6P**
Goteborg Univ. (Sweden). Dept. of Physiology.
THE INFLUENCE OF THROMBOCYTE AGGREGATION ON RENAL CIRCULATION.
by Lars O. Hansson, and Hannes Odelram. 1965, 65p
Contract AF 61 (052)-732
An experimental study in the cat.

Descriptors: (*Kidneys, Blood circulation), (*Blood platelets, *Blood circulation), (*Blood transfusions, Hypothermia), Blood coagulation, Vasoactive agents, Hematocrit, Erythrocytes, Parenteral infusions, Body temperature, Tissue extracts, Histology, Cats, Sweden.

Changes in renal blood flow during local perfusion hypothermia with cooled autologous blood, and after experimentally induced thrombocyte aggregation during normothermia, have been analysed in the cat. Perfusion cooling of the kidney to 20C caused a two- to threefold increase in renal vascular resistance in most cases. However, in one-fourth of the animals investigated perfusion cooling provoked an extreme increase in flow resistance, eventually causing a complete renal blood flow obstruction at temperatures below 30C. Most of these animals showed signs of infections of various kinds. The cold-induced increase in vascular resistance, whether moderate or extreme, could not be ascribed to any renal vasoconstriction, since the renal vessels were found to relax on cooling below 30-28C and to be largely insensitive to constrictor influences at temperatures around 20C. Cooling of the blood induced a significant drop in thrombocyte counts and when a complete renal blood flow obstruction ensued, the small renal vessels were occluded by aggregated thrombocytes. This was especially easily demonstrated in the glomerular capillaries. In these cases flushing with warm cellfree perfusates readily rinsed the renal vascular bed free of the aggregates if performed within 15-20 minutes after the complete obstruction occurred; after that period the obstruction became irreversible. (Author)

AD-636 696 **Field 6P**
Goteborg Univ. (Sweden). Dept. of Physiology.
STUDIES ON THE EFFERENT VAGAL CONTROL OF THE STOMACH.
by Jan Martinson. 1965, 23p
Contract AF 61 (052)-732

Descriptors: (*Stomach, *Autonomic nervous system), Blood vessels, Blood circulation, Inhibition, Stimulation, Nerves, Nerve fibers, Reflexes, Muscles, Secretion, Ganglia, Thresholds (Physiology), Neuromuscular transmission, Cats, Sweden.

Various gastric responses to efferent vagal stimulation were studied in acute experiments on cats. The following observations were made: The vagus nerves of the cat contain efferent nerve fibres of two types, the excitation threshold of one differing from that of the other. The low-threshold group enhances gastric motility, while the high-threshold group enhances secretion of acid and pepsin, increases blood flow in the stomach, and produces marked relaxation of the corpus-fundus region. The vagally elicited gastric motor inhibiton is essentially a relaxation, with a manifold increase in the volume of the stomach at very low transmural pressures. This gastric relaxation is not adrenergic but elicited by some unknown mechanism. It does not act by inhibiting the excitatory intramural ganglionic cells but exerts its action on the presumably myogenic activity of the gastric smooth muscles. In these respects the vagal relaxing fibres differ strikingly from the sympathetic inhibitory fibres. It seems probable that the gastric responses, elicited by the high-threshold fibres form a pattern of responses also under 'physiological' conditions, then being involved in the elicitation of the cephalic phase of digestion. (Author)

AD-636 698 **Field 6P**
Goteborg Univ. (Sweden).
THE VAGAL CONTROL OF THE JEJUNAL AND ILEAL MOTILITY AND BLOOD FLOW.
by Jan Kewenter. 1965, 8p
Contract AF 61 (052)-732, Grant PHS-H-5675

Descriptors: (*Blood circulation, Intestines), (*Intestines, Autonomic nervous system), Blood vessels, Control, Stimulation, Acetylcholine, Epinephrine, Blood volume, Nerve fibers, Neuromuscular transmission, Ganglia, Nerve impulses, Nerves, Peristalsis, Reflexes, Electrophysiology, Cats, Sweden.

The vagal influence on the jejunal and ileal motility and blood flow were studied by means of graded vagal stimulations at the cervical, intrathoracic and subdiaphragmatic levels in urethane-chloralose anaesthetized cats. The responses in the two parts of the small intestine to graded stimulations of the splanchnic nerves were also investigated, as were the responses to intravenously administered acetylcholine and adrenaline. The jejunal and ileal motor activity were recorded continuously by registering changes in the intraluminal volume at a relatively constant transmural pressure and the blood flow through the two intestinal loops was measured as the venous outflow. On the basis of the results obtained in the present investigation the following conclusions seem to be justified. The jejunal and ileal sections of the small intestine are supplied with vagal excitatory fibres to approximately the same extent. However, while vagal stimulation induced motor responses in the jejunum in all experiments, the responses of the ileum were insignificant or absent in about half of the experiments. This difference was shown to be due to the action of inhibitory fibres in the splanchnic nerves distributed mainly to the ileum. Such an inhibitory neurogenic action could completely suppress the vagal excitatory influence on the ileum. These sympathetic inhibitory fibres seem to exert their action at the ganglionic level in the ileum. The vagal nerves at the neck level do not contain any inhibitory fibres to the small intestine. The 'physiological' range of impulse discharge of the vagal motor fibres to the small intestine seems to be between zero and 8 - 10 imp./sec in agreement with other autonomic neuroeffector systems. (Author)

AD-636 702 **Field 6P, 6A**
Pennsylvania Hospital, Philadelphia. Dept. of Molecular Biology.
ALL-OR-NONE ADSORPTION BY LIVING CELLS AND MODEL PROTEIN-WATER SYSTEMS: DISCUSSION OF THE PROBLEM OF 'PERMEASE-INDUCTION' AND DETERMINATION OF SECONDARY AND TERTIARY STRUCTURES OF PROTEINS.
by Gilbert N. Ling. 1966, 14p
Contract Nonr-4371 (00), Grant NSF-GB-2637
Proj. NR-105 327
Supported in part by Grants NSF-GB-3921, PHS-2R01-GM11422-03, and PHS-2R01-GM-1142202

Descriptors: (*Cells (Biology), *Adsorption (Biological)), (*Proteins, Molecular properties), Cell structure, Transformations, Polymers, Theory, Thermodynamics, Solutions, Molecular association, Permeability, Enzymes, Gels.

The theme is developed that coordinated activity of living cells and their subcellular structures is based on the ability of a protein-water-solute system to undergo cooperative transitions under the influence of a variety of physiological stimuli. A theoretical isotherm for adsorption on a linear polymer with cooperative interation between nearest neighboring sites is examined in some detail. Using this technique, a broad examination of adsorption phenomena in protein solutions, as well as in inanimate protein-aqueous fixed charge systems such as sheep's wool and collagen in the light of the theoretical isotherm leads to the conclusion that cooperative states of protein are defined not by the protein alone, but also by the solutes and solvents with which the protein associates. Next, the evidence for the cooperative interaction of water in the protein-water system was discussed. The article ends with the suggestion that the permease induction phenomenon in bacteria arises from the cooperative adsorption of sugars onto the cellular proteins. Such cooperative adsorption determines in all-or-none manner the selective propensity for adsorption of and, thus, accumulation of, the specific solute as well as the specific secondary and tertiary structures of the protein-water-solute system.

AD-636 710 **Field 6P, 6E**
Yale Univ., New Haven, Conn. Dept. of Surgery.
SOME OBSERVATIONS ON THYROID-ADENOCORTICAL INTERRELATIONSHIPS.
by Ira A. Goldenberg, Paul H. Blodinger, and Robert A. Grummon. 13 Aug 64, 8p
Contract Nonr-609 (10), Grant PHS-AM-02722-04
Proj. NR-105 057

Descriptors: (*Thyroid hormones, Biosynthesis), (*Adrenal cortex hormones, Secretion), Surgery, Stress (Physiology), Steroids, Drugs, Lungs, Excision, Thyroid gland, Adrenal cortex, Radioactive isotopes.

Identifiers: Methimazole.

Thyroid and adrenocortical activity and interrelations in the postoperative period have been evaluated in three groups of dogs: (A) intact control animals; (B) animals with thyroid gland suppression accomplished by administration of methimazole; and (C) totally adrenalectomized animals. The intact animals displayed inconsistent and statistically insignificant alterations in radioactive iodine conversion ratios in systemic and thyroid vein blood after a standard operation of pulmonary lobectomy. Maximum plasma 17-hydroxycorticosteroid levels and the range of their variability were lower in animals when thyroid gland hormone synthesis was blocked by administration of methimazole than in intact animals. The difference between the groups is statistically significant and indicates the existence of a physiologic interrelation between the thyroid and the adrenal cortex in the dog after operative stress. Adrenalectomy appeared to have little effect on thyroid function after pulmonary lobectomy as measured by radioactive iodine conversion ratios. (Author)

AD-636 724 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Devlopment Center, Johnsville, Pa. Aerospace Medical Research Dept.
DECREASE OF METABOLIC RATE BY PREOPTIC LESIONS AS CAUSE OF HYPOTHERMIA IN CATS.
by F. H. Jacobson, and R. D. Squires. 7 Jul 66, 20p NADC-MR-6605
R360-FR-102/2021/R01-101-01

Descriptors: (*Hypothermia, *Metabolism), Brain, Pathology, Oxygen consumption, Heat production (Biology), Shivering, Blood vessels, Body weight, Cats.

The persistence of hypothermia in eight cats with lesions in the medial preoptic region of the forebrain was due in large part to their lower oxygen consumption per unit body weight after operation. Vasodilation inappropriate to the low body temperature occurred sometimes, as did vasoconstriction inappropriate to the rare high body temperature. Usually the cats were appropriately vasoconstricted. There was no decrease of the oxygen consumption per kilogram by five unoperated cats fasted until they lost 16.3% (mean) of their body weight. (The operated cats had lost 14.1% of their body weight). The lower metabolic rate of the lesioned cats, therefore, did not result from weight loss or reduced food intake, but from loss of preoptic tissue which normally, when its temperature falls, stimulates metabolism. (Author)

AD-636 748 **Field 6P**
London Univ. (England). Dept. of Biochemistry.
CHARACTERISTICS REQUIRED IN ELECTRICAL PULSES OF RECTANGULAR TIME-VOLTAGE RELATIONSHIPS FOR METABOLIC CHANGE AND ION MOVEMENTS IN MAMMALIAN CEREBRAL TISSUES.
by Henry McIlwain, and Pierre Joanny. 14 Nov 62, 12p
Grant AF-EOAR-62-4

Descriptors: (*Cerebral cortex, Electrophysiology), (*Electrolytes (Physiology), Metabolism), Respiration, Potassium, Sodium, Ions, Inhibition, Chlorpromazine, Barbiturates.

Identifiers: Trimethadione, Protoveratrines, Tetrahydro aminoacridines, Phenobarbitone, Ion transport.

The pulses caused loss of K, gain in Na and increase in respiration by isolated cerebral cortical tissue. These changes commenced at applied potentials 1-2 V and reached maxima at 7.5 V. Pulses of duration between 0.03 and 0.4 msec gave increasing effects. Response increased with increase in frequency between 2 and 30/sec but little greater effect usually ensued with higher frequencies. With submaximal pulses of 5 or 7.5 V, 0.4 msec and relatively low frequencies the initial changes in Na and K per pulse were approximately equivalent and between 5 and 6 millimicromoles/g tissue/pulse. Similar pulses caused a sustained increase in respiration of 1.56 micromoles O2/g tissue/pulse. The increase in respiration was susceptible to inhibition by relatively low concentrations of chlorpromazine, and by phenobarbitone and 1,2,3,4-tetrahydro-5-aminoacridine. Response to sparse pulese was increased by protoveratrine A but response to pulse-types tested was unaffected by 4 other substances including trimethadione. (Author)

AD-636 753 **Field 6P, 5J**
CFSTI Prices: HC$2.60 MF$0.50
Cambridge Univ. (England). Psychological Lab.
STUDIES OF: (A) THE VISUAL FIELDS OF MONKEYS. (B) MEMORY PREOCESES AS AFFECTED BY CEREBRAL LESIONS IN MONKEYS.
Final technical rept.
by Lawrence Weiskrantz. 30 Nov 62, 22p
Grant AF-EOAR-62-20

Descriptors: (*Memory, Psychophysiology), (*Vision, Psychophysiology), Cerebral cortex, Monkeys, Great Britain.

The work consists of the analysis of the visual cortex and its relation to behaviour, and of the changes in mnemonic function following circumscribed cerebral lesions and stimulation in the monkey. The work is concerned with establishing the nature of the residual capacity and of trying to determine whether the basis for the acuity results lies within the retinal grain or in the non-independence of

units within the visual pathways. The work suggests that the residual capacity is simply the integral of the types of responses found from retinal ganglion cells. Memory changes were analyzed in terms of a distinction between short-term and long-term processes. Results tentatively suggest that frontal cortical lesions or stimulation, might be characterized as producing an alteration in retrieval from the short-term store, this in turn being produced by an alteration in stimulus sampling. Temporal lobe lesions appear to affect transfer from short-term to long-term store, without affecting the capacity of either store. Current work is directed towards finding the critical structures, if any, in the temporal lobes and also in thalamic regions. (Author)

AD-636 756 **Field 6P**
CFSTI Prices: HC$2.00 MF$0.50
Netherlands Red Cross Blood Transfusion Service, Amsterdam. Central Lab.
FACTORS INFLUENCING FIBRINOLYSIS.
Final scientific rept., 1 Jan-31 Dec 64.
by J. Vreeken. 31 Dec 64, 26p
Contract AF 61 (052)-770

Descriptors: (*Phosphorus transferases, Excretion), Urine, Chemical analysis, Diurnal variations, Rhythm (Biology), Blood coagulation, Enzyme precursors, Thrombin, Plasmin, Muscles, Exercise, Drugs, Immune serums, Antigens + antibodies, Drugs, Pathology, Netherlands.

Special circumstances which may influence the urokinase determination in practise were examined. Normal and abnormal urokinase excretion were clearly defined. It seems to be that under circumstances of normal life, the urokinase excretion is constant every 24 hours. It is a personal characteristic and even through the year the excretion is astoundingly constant. The normal excretion in the female is somewhat lower than in the male. There is no 'day-night' rhythm for urokinase excretion. After periods of high blood fibrinolytic activity there is no increase of the urokinase excretion. It does not matter whether this increased activity is obtained by muscular exercise or by drug injection. It is concluded, therefore, that urokinase is not an excreted blood activator. There is a rough correlation between urokinase excretion and glomerular function measured as creatinine clearance. The antibodies which we developed against urokinase of different species are species specific. In the Ouchterlony technique it appears that this antiserum contains at least 3 precipitating antibodies against components of the injected urokinase preparation. In experiments with animals, injected intravenously with a high dosis of anti-urokinase, no special pathology developed and the urokinase excretion did not significantly decrease. (Author)

AD-636 757 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Agricultural Research Council, Babraham (England). Inst. of Animal Pysiology.
SECRETORY RESPONSES OF EXTRAMEDULLARY CHROMAFFIN TISSUE.
Technical rept.
by E. Muscholl, and M. Vogt. 30 Sep 63, 22p
Grant AF-BOAR-62-19

Descriptors: (*Nerves, Amines), (*Amines, Secretion), Ganglia, Levarterenol, Adrenaline, Nerve impulses, Acetylcholine, Drugs, Stimulation, Inhibition, Alkaloids, Tissues (Biology), Great Britain.

Identifiers: Chromaffin tissues.

When the isolated inferior mesenteric ganglion of the dog was perfused with Locke solution, the effluent contained noradrenaline and adrenaline. At rest the amount of noradrenaline released ranged from 0.7 to 40 ng/min, that of adrenaline from 0.7 to 25 ng/min. Electrical stimulation of the inferior splanchnic nerves did not alter the catecholamine content of the perfusate, and stimulation of the ascending mesenteric nerves caused an increase to little more than twice the resting value. When acetylcholine and dimethylphenylpiperazinium iodide were infused into the preparation, the catecholamine content of the effluent rose to an amount ranging from 6 to 100 times the resting level. Two drugs with muscarinic action (pilocarpine and N-benzyl-3-pyrrolidyl acetate methobromide) produced only a very small stimulation of catecholamine release. Angiotensin, in doses ranging from 20 ng to 2 micrograms, inhibited release of catecholamines, and bradykinin had a weak stimulatory effect. It is suggested that the catecholamines released into the effluent were derived from chromaffin tissue in the ganglion; evidence for innervation of this tissue was unobtainable, but its catecholamines were readily released by the injection of nicotinic substances. (Author)

AD-636 769 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Hiroshima Univ. (Japan). Dept. of Physiology.
THE VAGAL INHIBITORY RESPONSES OF THE STOMACH TO STIMULATION OF THE DOG'S HIGHER BRAIN STEM.
Rept. no. 1, Jul 65-Jul 66 (Final).
by Takehiko Semba. Jul 66, 21p
Contract DA-92-557-FEC-38416
Proj. DA-2N014501B71D
Task 00-036-FE
ARDG-J-247-2

Descriptors: (*Stomach, *Autonomic nervous system), Nerves, Inhibition, Stimulation, Motor reactions, Reflexes, Nervous system, Physiology, Histology, Brain, Dogs, Japan.

Identifiers: Medulla oblongata.

The inhibitory response of the stomach movements through the vagus nerve was investigated on the dog's pons which was transected the spinal cord previously. The stimulated areas were examined histologically. The inhibitory responses of the stomach movements were induced through the vagus nerve by the stimulation of the pons, as well as the motor responses of the stomach movements. The vagal inhibitory responses were abolished by the bilateral vagotomy and also after the application of hexamethonium bromide. It may be concluded from this experiment that the adrenergic fibers which inhibit the stomach movements are contained in the vagus nerve (motor). A large number of the inhibitory areas were located in the reticular formation, the medial longitudinal fascicle and the vestibular areas. (Author)

AD-636 796 **Field 6P**
School of Aerospace Medcine, Brooks AFB, Tex.
THE 'SCOTIC RESPONSE' IN THE CAT.
by Donald G. Pitts. Oct 65, 13p SAM-TR-66-205
Prepared for presentation at the American Academy of Optometry Meeting (Annual), Columbus, Ohio, December 14, 1964.

Descriptors: (*Vision, Adaptation (Physiology)), Reflexes, Ophthalmology, Pharmacology, Eye, Measurement, Cats.

A method is presented for measuring the apparent increase in the dioptrics of the cat's eye due to a decrease in ambient luminance. The response was defined as the scotic response. At least three processes of vision which might influence the output of the infared optometer are: (1) changes in the concentration of rhodopsin, (2) changes in the tapetal reflectance, and (3) accommodation changes. It was shown that neither the pharmacological effects of the drugs used in the experimentation nor rhodopsin changes could enter into the scotic response. The magnitude of the scotic response averaged 4. 4D. in nine animals. The cat's amplitude of accommodation appears to have sufficient range to account for most of the scotic response; however, the effects of tapetal reflectance cannot be discounted. It is concluded that both accommodation and tapetal reflectance are probably responsible for the scotic response. Accommodation can account for a large part of it. Further studies must be made of the role and magnitude of tapetal reflectance. (Author)

AD-636 799 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Goteborg Univ. (Sweden). Dept. of Physiology.
THE NEUROGENIC CONTROL OF THE CARDIOVASCULAR SYSTEM.
Annual summary rept. no. 1.
by Bjorn U. G. Folkow. 10 Oct 64, 15p
Contract AF 61 (052)-732

Descriptors: (*Cardiovascular system, Control), Nervous system, Sweden, Physiology, Reviews, Blood vessels.

For abstract, see T 66 18.

AD-636 800 **Field 6P, 5J**
CFSTI Prices: HC$1.60 MF$0.50
College de France, Paris. Institut de Neurophysiologie Generale.
NERVOUS PROCESSES IN BEHAVIOR AND LEARNING.
Final technical rept. 1 May 61-30 Apr 63.
30 Apr 63, 17p
Contract AF 61 (052)-475

Descriptors: (*Nervous system, *Behavior), (*Learning, Nervous system), Cells (Biology), Anesthetics, Retention, Control.

For abstract, see T 66 18.

AD-636 912 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Rochester Univ., N. Y. Dept. of Electrical Engineering.
ELECTRICAL RESISTIVITY OF LUNG AT 100 KC./SEC.
Rept. for Oct-Dec 65.
by Edwin Kinnen, and D. Witsoe. Jun 66, 16p
Contract AF 41 (609)-2278
Task 775802
SAM-TR-66-51

Descriptors: (*Lungs, Resistance (Electrical)), Electrophysiology, Dogs.

Average resistivity values of the lung were determined from measurements made on the surface of canine lung in vivo at 100 kc./sec. Data were taken at various levels of expiration with several different electrode configurations on each of 7 dogs. Theoretical considerations assumed the lung to be a homogeneous, isotropic, and primarily resistive medium at this frequency. The linear regression equation for resistivity as a function of lung air volume representing all data was calculated. The variation of resistivity values is characterized by a standard deviation of 180 ohm cm. for the distribution of individual experiment averages about the average of all data, at one-half expiration level. On the basis of assumptions relating normal and collapsed lung air volume, the resistivity of canine lung in situ can be expected to be around 1,800 ohm cm. at normal expiration. With inspiration, this value increases linearly by approximately 230 ohm cm. per 100 cc. Both of these values are expected to vary within 30% for an individual experiment, however. Comparison of the data taken with the various measurement technics on an individual animal indicated no discrepancy. (Author)

AD-637 025 **Field 6P**
CFSTI Prices: HC$2.00 MF$0.50
Guy's Hospital Medical School, London (England).
CEREBRAL GLUCOSE MECHANISM.
Final technical rept.
by W. J. H. Butterfield. May 65, 34p
Contract AF61 (052)-693

Descriptors: (*Brain, Metabolism), (*Insulin, Brain), (*Glucose, Brain), Amino acids, Hormones, Tissues (Biology), Muscles, Great Britain.

Strong evidence is presented that insulin affects the brain, altering the kinetics governing its uptake of glucose and some amino acids; effects which are usually obscured by the hormone's action on the peripheral tissues where it exerts more rapid changes in the same direction. (Author)

AD-637 027 **Field 6P**
CFSTI Prices: HC$4.60 MF$0.50
Istituto Nazionale di Ottica, Florence (Italy).
BASIC RESEARCH ON RETINAL MECHANISMS AND RESPONSES.
Technical rept.
by M. Bittini, A. M. Ercoles, A. Florentini, and L. Ronchi. 31 Oct 62, 43p
Grant AF-EOAR-61-34

Descriptors: (*Retina, Reflexes), (*Vision, Adaptation (Physiology)), Visual perception, Brightness, Electroretinography, Italy.

Investigations were conducted on the visual perception of contours; on the sensation of brightness; and on retinal response to lights of diffirent spectral composition, by taking as index both critical flicker frequency and electroretinographic intensity function. Long-term adaptation and training relative to ERG response were also studied. (Author)

AD-637 030 **Field 6P, 5J**
CFSTI Prices: HC$1.10 MF$0.50
University Coll., London (England).
ANATOMICAL LOCALIZATION OF TARGET LEARNING AND MEMORY.
Final rept. Jun 62-Jun 63.
by J. Z. Young. Jun 63, 11p
Grant AF-EOAR-61-39

Descriptors: (*Learning, Psychophysiology), (*Memory, Psychophysiology), Motivation, Targets, Nervous system, Anatomy, Great Britain, Cybernetics, Brain.

Contents: Some essentials of neural memory systems; Classifying systems; Functions of the signals of results of action; Control of 'motivation' by balancing food and pain signals; Failure to 'read-in' and 'read-out' from the memory; Pairs of centres in tactile and visual learning systems; Signals of results and distance receptors in mammals; Excitatory and inhibitory synaptic systems; Nature of the neural memory.

AD-637 032 **Field 6P**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
ON THE SOUND PRESSURE TRANSFORMATION BY THE HEAD AND AUDITORY MEATUS OF THE CAT.
by Francis M. Wiener, Russell R. Pfeiffer, and Ann S. N. Backus. 16 Jun 65, 15p
Contract DA-36-039-AMC-03200 (E), Grant NSF-GP-2495
Grants PHS-MH-04737-05, NsG-496, NIH-NB-01344.

Descriptors: (*Auditory perception, Pressure), Sound, Ear, Acoustics, Frequency, Cats.

Anesthetized cats were supported by a canvas cradle in a sound-proof chamber and were exposed to a progressive sound wave. A flexible probe microphone was implanted in the external auditory meatus and used to measure the sound pressure in the vicinity of the eardrum. A duplicate probe was used to measure the sound pressure at a point near the center of the cat's head in the absence of the animal. From these measurements the magnitude of the ratio of the sound pressure near the eardrum to that in the free field was determined as a function of frequency. When the ear under study was turned toward the sound source, the sound pressure near the eardrum exceeded the free-field pressure appreciably, except at appreciably, except at very low frequencies. By measuring the sound pressure near the tragus, the resonance of the external auditory meatus itself could be determined. The data obtained in this study can be used to compare results of experiments in which the acoustic stimulus is measured in terms of free-field pressures with those in which the stimulus is measured in terms of the sound pressure near the eardrum. (Author)

AD-637 033 **Field 6P**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
ON THE PROPAGATION OF THE NERVOUS IMPULSE DOWN MEDULLATED AND UNMEDULLATED FIBERS.
by William F. Pickard. 26 May 65, 17p
Contract DA-36-039-AMC-03200 (E), Grant NSF-GP-2495
Contract AF 33 (615)-1747, Grants PHS-MH-04737-05, NsG-496.

Descriptors: (*Nerve impulses, *Nerve fibers), Ionic current, Circuits, Voltage, Differential equations, Functions.

The medullated fiber is represented by a distributed active circuit and an expression involving the several ionic conductances is obtained for the voltage variation at a node; an heuristic argument is offered to show that this voltage cannot in general be described by an ordinary, linear, second-order differential equation even if the ionic conductances are specifically known as functions of time. It is also shown that the conduction velocity of a class of unmyelinated fibers can be approximated by a simple algebraic function of the fibers' parameters. (Author)

AD-637 038 **Field 6P**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
CLASSIFICATION OF RESPONSE PATTERNS OF SPIKE DISCHARGES FOR UNITS IN THE COCHLEAR NUCLEUS: TONE-BURST STIMULATION.
by Russell R. Pfeiffer. 23 Oct 65, 17p
Contract DA-36-039-AMC-03200 (E), Grant NSF-GP-2495
Grants PHS-MH-04737-05, NsG-496, NIH-NB-01344.

Descriptors: (*Hearing, Physiology), Ear, Stimulation, Nerves, Histology.

When poststimulus time histograms are computer for tone-burst stimulation, certain shapes of histograms, or response patterns, were more often observed than others for units in the cochlear nucleus. The shapes of patterns that are observed depend upon stimulus parameters. These response patterns of units in the cochlear nucleus lend themselves to classification into categories; a given group of units has not only response patterns in common but often also other properties. (Author)

AD-637 040 **Field 6P**
Genoa Univ. (Italy).
BLOOD PRESSURE DURING NATURAL SLEEP IN CATS.
by G. F. Rossi, E. Favale, A. Giussani, and O. Candia. 1961, 1p
Contract AF 61 (052)-461
AFOSR-3450

Descriptors: (*Sleep, Blood pressure), Electroencephalography, Nervous system, Physiology, Stimulation, Thresholds (Physiology), Behavior, Electrophysiology, Cats, Italy.

Identifiers: Electromyography.

For abstract, see T 66 18.

AD-637 041 **Field 6P**
Genoa Univ. (Italy).
BLOOD PRESSURE DURING NATURAL SLEEP AND DURING SLEEP INDUCED BY ELECTRICAL STIMULATION OF THE BRAIN STEM RETICULAR FORMATION.
by O. Candia, E. Favale, A. Giussani, and G. F. Rossi. 1962, 19p
Contract AF 61 (052)-461
AFOSR-4170

Descriptors: (*Sleep, Blood pressure), Electroencephalography, Stimulation, Electric currents, Brain, Nervous system, Physiology, Electrophysiology, Cats, Italy.

Identifiers: Electromyography.

Arterial blood pressure was recorded in intact, unanesthetized, free moving cats through a cannula permanently inserted into the carotid or femoral artery. The cats were also carrying implanted electrodes for EEG and EMG recording and for electrical stimulation of peripheral and central nervous structures. The changes of blood pressure during sleep were analysed and compared with those occurring in the electrocortical rhythms and in the electrical activity of the posterior cervical muscles. (1) A slight decrease of the blood pressure may occur at the beginning of sleep, when synchronized patterns are present in the EEG and the EMG activity is of moderate amplitude. (2) A constant and marked blood pressure fall is observed during deep sleep, when the EEG rhythms are desynchronized and the EMG becomes completely flat. (3) Blood pressure oscillations of variable amplitude and of long duration may be recorded during deep sleep in spite of the uniformity of the EEG and EMG patterns. (4) The threshold of arousing stimuli is related to the level of the blood pressure, reaching its highest values in coincidence with the lowest pressure levels and viceversa. (5) The behavior of the blood pressure during deep sleep episodes induced by electrical stimulation of the brain stem reticular formation is similar to the one observed during the natural episodes of deep sleep. (6) The conclusion is reached that the study of the blood pressure provides important information on the depth of sleep. Electrocortical rhythms, electrical activity of the posterior cervical muscles and blood pressure should be recorded simultaneously in order to obtain a correct and reliable evaluation of the deepness of sleep. (Author)

AD-637 042 **Field 6P**
Genoa Univ. (Italy).
RESEARCHES ON THE NERVOUS MECHANISMS UNDERLYING DEEP SLEEP IN THE CAT.
by G. F. Rossi, E. Favale, T. Hara, A. Giussani, and G. Sacco. 1961, 24p
Contract AF 61 (052)-461

Descriptors: (*Sleep, *Central nervous system), Electroencephalography, Relaxation (Physiology), Behavior, Nervous system, Physiology, Stimulation, Electric currents, Inhibition, Electrophysiology, Barbiturates, Cats, Italy.

Identifiers: Electromyography.

The present study is devoted to the neural mechanisms underlying the deep sleep episodes characterized by complete postural relaxation and EEG desynchronization. Unanesthetized, free moving cats carrying chronically implanted electrodes for EEG and EMG recording and for electrical stimulation of peripheral and central nervous structures have been used. (1) The EEG, EMG and behavioral criteria followed for the valuation of the depth of sleep are described. (2) Low rate electrical stimulation of the thalamic and reticular EEG synchronizing systems is ineffective during deep sleep. (3) The intravenous injection of Thiopental Sodium during deep sleep yields a further increase of the threshold of reticular and sensory arousal leaves the EMG silence unaffected but induces EEG synchronization. Low rate electrical stimulation of the thalamic recruiting system becomes once more effective following the injection of barbiturate. (4) High rate electrical stimulation of the brain stem reticular formation, which is followed by arousal when it is performed during light sleep, may lead to central and peripheral episodes of deep sleep if it is performed during the intermediate stage of sleep. (5) On the basis of these results

the hypothesis is made that: (a) the EEG desynchronization that characterizes the deep sleep episodes results from the functional depression of the subcortical systems which are responsible for EEG synchronization; (b) this depression is due to the influence of an inhibitory mechanism which becomes active at the onset of the spisodes of deep sleep.

AD-637 043 **Field 6P**
Genoa Univ. (Italy).
INDUCTION OF SLEEP IN CATS BY ELECTRICAL STIMULATION OF THE BRAIN STEM RETICULAR FORMATION.
by E. Favale, A. Guissani, and G. F. Rossi. 1961. 1p
Contract AF 61 (052)-461
AFOSR-3449

Descriptors: (*Sleep, Electrophysiology), Electroencephalography, Brain, Stimulation, Relaxation (Physiology), Nervous system, Physiology, Behavior, Cats, Italy.

Identifiers: Electromyography.

For abstract, see T 66 18.

AD-637 045 **Field 6P**
Maudsley Hospital, London (England). Dept. of Neuroendocrinology.
SEXUAL DIFFERENTIATION OF THE BRAIN AND ITS EXPERIMENTAL CONTROL.
by G. W. Harris, and S. Levine. 1962. 2p
Contract AF 61 (052)-454
AFOSR-4201

Descriptors: (*Sex hormones, *Central nervous system), Brain, Sex glands, Testosterone, Estrogens, Secretion, Pituitary gland, Behavior, Sex, Males, Females, Rats, Great Britain.

For abstract, see T 66 18.

AD-637 046 **Field 6P**
Centre National de la Recherche Scientifique, Paris (France).
SITE OF ORIGIN AND PROPAGATION OF SPIKE IN THE GIANT NEURON OF APLYSIA.
by L. Tauc. 28 Dec 61. 22p
Contract AF 61 (052)-475
Prepared in cooperation with Institut de Biologie Marine, Arcachon (France).

Descriptors: (*Nerve cells, *Nerve impulses), (*Gastropoda, Nerve impulses), Stimulation, Electrical discharges, Electrophysiology, France.

Identifiers: Aplysia.

The form and time sequence of spikes generated by orthodromic, antidromic, and direct stimulation and during spontaneous activity were studied with intracellular electrodes simultaneously introduced in the soma and in different parts of the axon of the giant nerve cell of Aplysia. Evidence was obtained that under normal conditions of excitability, the spike originates at some distance from the soma in an axonal region with a higher excitability surpassing that of the surrounding membranes. Between the trigger zone and the soma is situated a region of transitional excitability where the conduction of the spike towards the soma may be blocked at a functionally determined and variable locus. The cell body is electrically excitable, but has the highest threshold of all parts of the neuron. The inactivation or even the removal of the cell body does not suppress synaptic transmission. (Author)

AD-637 047 **Field 6P**
Centre National de la Recherche Scientifique, Paris (France).
MODES OF INITIATION AND PROPAGATION OF SPIKES IN THE BRANCHING AXONS OF MOLLUSCAN CENTRAL NEURONS.
by L. Tauc, and G. M. Hughes. 9 Jul 62. 18p
Contract AF 61 (052)-475
Prepared in cooperation with Institut de Biologie Marine, Arcachon (France).

Descriptors: (*Nerve cells, *Nerve impulses), (*Mollusca, Nerve impulses), (*Gastropoda, Nerve impulses), Ganglia, Stimulation, Electrical discharges, Electrophysiology, France.

Identifiers: Aplysia.

A study was made of Aplysia nerve cells, mainly in the pleural ganglia, in which the main axon divides into at least two branches in the neighbourhood of the soma. Conduction between these branches was investigated by intracellular recordings from the soma following antidromic stimulation via the nerves containing the axonal branches. It was shown that transmission between separate branches need not involve discharge of the soma but only of the axonal region between the soma and the origin of the branches. In some cells, the spike may fail to invade the other axonal branch, whereas transmission in the opposite direction is readily achieved. Often spikes in none of the branches are transmitted to the others, unless facilitated. Indications about the geometry of the neuron in the vicinity of the soma may be obtained from the study of the relative size of the A spikes originated in different branches. These observations, together with the presence of different sizes of A spikes, produced by orthodromic stimulation, provide evidence that spikes initiated at separate axonal 'trigger zones' of Aplysia neurons may be conducted selectively to the effectors or other neurons innervated by the particular branch. (Author)

AD-637 048 **Field 6P**
Centre d'Etudes de Physiologie Nerveuse et d'Electrophysiologie, Paris (France).
SENSORY RESPONSES RECORDED FROM THE RABBIT MOTOR CORTEX.
by P. Cazard, and P. Buser. 17 Aug 62. 10p
Contract AF 61 (052)-475
Text in French; summary in English.

Descriptors: (*Electroencephalography, Brain), Cerebral cortex, Rabbits, France, Sensory mechanisms.

The characteristics of 'non-primary' sensory responses recorded from the rabbit's neocortex were investigated. Owing to the almost complete absence of 'associative' areas in this species, attention was drawn to activities recorded from the motor cortex. Three types of preparations were used: deep chloralose anesthesia, local anesthesia associated with curarization, free implanted animals. Responses may be elicited on the motor cortex by somesthetic, auditory and visual stimulations. These non-primary responses are especially easily observed in normal implanted animals; in acute preparations, somesthetic responses are well developed, whereas auditory and visual ones are usually small. Evoked potentials from the motor area are distinguished from primary sensory responses by various characteristics, such as a longer latency, a higher sensitivity to repetition of the stimuli, or to depressive actions; even small doses of nembutal abolish them. In unanesthetized preparations (curarized or free), their amplitude depends upon the general electrocortical activity, in that arousal reactions abolish them. These responses closely resemble phenomena recorded from the cat's motor area. In the rabbit, also, the motor cortex thus appears as a 'polysensory' area. (Author)

AD-637 049 **Field 6P**
Centre d'Etudes de Physiologie Nerveuse et d'Electrophysiologie, Paris (France).
THALAMIC INTEGRATIONS AND THEIR CONSEQUENCES AT THE TELENCEPHALIC LEVEL.
by D. Albe-Fessard, and A. Fessard. 1961. 35p
Contract AF 61 (052)-475

Descriptors: (*Thalamus, Electrophysiology), Brain, Nerve impulses, Nerve fibers, Nervous system, Physiology, Stimulation, Inhibition, Anesthetics, Cats, France.

Some integrative aspects presented by diverse, non-primary, telencephalic projections are examined. It is suggested that they are not necessarily related to primary activities and may depend upon lower integrations. The integrations are examined of somatic afferents in the thalamus, as well as to subjacent integrations in the brain stem, which thus give rise to 'projected convergence' towards the diencephalon, and then towards the telencephalon. The thalamo-telencephalic projections of the extra-lemniscal system are considered and finally the interactions which take place between the two systems of afferents at the level of the primary somatic area are discussed.

AD-637 091 **Field 6P**
Istituto Nazionale di Ottica, Florence (Italy).
ON THE GAIN IN DIFFERENTIAL SENSITIVITY WHEN PASSING FROM MONOCULAR TO BINOCULAR VISION.
by Lucia Ronchi, and Ercole Gloria. 1965. 13p
Contract AF 61 (052)-850
Prepared in cooperation with Clinica Oculistica Dell' Universita di Pisa.

Descriptors: (*Vision, Sensitivity), Italy, Light, Visual perception.

Sensitivity to luminance differences was determined under various experimental conditions as far as diameter of the test-spot and fixation modalities are concerned. Binocular performance is found to be significantly greater than the expected performance, obtained by applying the law of independent probabilities to monocular chances of perception, right and left respectively. The amount of the above said 'gain' varies when passing from small to large test spots, in a manner which cannot be strictly related to the decrease in monocular sensitivity occurring when the area of the test spot is increased. In addition, if fixation is so rigorous and the gaze so steady that a periodical black-out of the adapting field occurs, the 'gain' varies, when the diameter of the test-spot is varied, as expected on the basis of a previous finding according to which perception of small spots is imparied by incoming fading, while perception of large spots is improved. (Author)

AD-637 092 **Field 6P**
Istituto Nazionale di Ottica, Florence (Italy).
ON THE VARIABILITY OF THE COURSE OF ELECTRORETINOGRAPHIC RESPONSE DURING INCOMING ADAPTATION TO LIGHT.
by Lucia Ronchi, and Anna Maria Ercoles. 1965. 25p
Contract AF 61 (052)-850

Descriptors: (*Light, *Adaptation (Physiology)), Electroretinography, Italy.

The course of ERG response during incoming adaptation to light is found to vary appreciably from one session to another, mainly during the preliminary sessions of a given group. The plot of average data recorded in a session, vs the order number of the session seems to show a cyclical behavior, which, in our opinion, might be ascribed to long-term adaptive processes, in the frame of retinal (training). The role played by other factors such as that past history of the eye (pre-exposure to sunlight, changes in recording resistance, etc.) is discussed. (Author)

AD-637 093 **Field 6P**
Istituto Nazionale di Ottica, Florence (Italy).
FLUCTUATION OF BRIGHTNESS PERCEPTION IN BINOCULAR, PARTIALLY MONOCULAR AND ACTUALLY MONOCULAR VISION.
by Lucia Ronchi, and Renato Sulli. 1965. 13p
Contract AF 61 (052)-850
Prepared in cooperation with Clinica Oculistica Dell' Universita di Pisa.

Descriptors: (*Visual perception, *Brightness), Vision, Italy.

A black square target is presented at the center of a uniformly bright field (empty field). The 'brightness' of the dark target is seen to fluctuate in time, if the effort is made of avoiding both eye movements and blinks. The amplitude of the fluctuation is greater when one eye only is viewing the target, while the contralateral eye is covered by a ground glass, than in the case where both the eyes are viewing the target. By taking into account the findings of some previous experiments where one eye was presented with a bright target surrounded by darkness, and the contralateral eye was covered by a dark sheet, the following conclusion is suggested. The visual system behaves like a 2nd order linear physical system with zero damping: the response to a constant input, therefore, fluctuates with time. If abstraction is made from dominance effects, the characteristics of the fluctuations of the two eyes, taken independently, may be assumed to be more-or-less equal. The binocular mechanism involves a phase shift, in order to reduce the amplitude of the resulting binocular fluctuation. When one eye only is viewing the target, a partial control, tending again to reduce the amplitude of fluctuation, is exerted by the adaptational state of the contralateral eye. The latency of such an effect, however, seems to be long compared to the period of brightness fluctuation; thus, by changing abruptly the viewing situation, it is possible to see how the perception mediated by one eye fluctuates when vision is actually monocular, in that contralateral influences are momentarily released. In a structured field, fluctuation is easily avoided by the aid of eye movements; in a scarcely structured field, also blinking plays a role. (Author)

AD-637 094 **Field 6P**
Istituto Nazionale di Ottica, Florence (Italy).
THE NEURAL ORGANIZATION OF THE CENTRAL RETINA AS REVEALED BY AN EXPERIMENT ON SIMULTANEOUS CONTRAST.
by Lucia Ronchi, and Giuseppe Salvi. 1965, 9p
Contract AF 61 (052)-850
Attached summary in Italian.

Descriptors: (*Vision, Adaptation (Physiology)), (*Visual perception, Brightness), Retina, Nervous system, Physiology, Italy.

An experiment is described which shows how the perception of brightness of the cross point of two dark bars, centrally fixated, varies as a function of the length of the bars; for a given value of length, l, the brightness fluctuates cyclically with time, the period of fluctation ranging forn 6 to 10 sec. A distortion of such a cyclical process occurs under incoming adaptation to light whatever l is, except for a number of values which will be regarded as critical. It may be argued that the central retina is so organized as to show a spatial succession of zones, which exert either inhibitory or disinhibitory effects, respectively, on the center of the fovea. The amplitude of this periodicity is about 50'. Thus, the fidelity of the visual system, as far as the perception of brightness at the cross point is concerned, depends on the length of the bars, and, the greater the l, 20 degree of fidelity, the lesser the transient response during the course of early adaptation to light. (Author)

AD-637 095 **Field 6P**
Istituto Nazionale di Ottica, Florence (Italy).
ERG RESPONSES TO A BLUE-RED-BLUE-RED SEQUENCE OF SCOTOPICALLY EQUIVALENT FLASHES.
by Anna Maria Ercoles. 1965, 12p
Contract AF 61 (052)-850
Attached summary in Italian.

Descriptors: (*Electroretinography, Colors), (*Vision, Colors), Retina, Visual perception, Italy.

The intensities of two flashes, red and blue respectively, have been so chosen as to evoke scotopic b-waves of the same size when impinging isolately on the dark-adapted retina. When such flashes are presented one after the other, in a blue-red-blue-red sequence, a small complex response is recorded. The characteristic features of this response are described in detail and discussed. (Author)

AD-637 096 **Field 6P**
Istituto Nazionale di Ottica, Florence (Italy).
SUBJECTIVE SHARPNESS THRESHOLD IN MAXWELLIAN VIEW AND UNDER NORMAL VIEWING CONDITIONS.
by Marcella Bittini, and Renato Sulli. 1964, 11p
Contract AF 61 (052)-850
Prepared in cooperation with Clinica Oculistica Dell'Universita di Pisa.

Descriptors: (*Vision, Light), Diffraction, Functional analysis, Eye, Italy, Thresholds (Physiology), Retina.

Subjective sharpness threshold, relative to a given test object, is determined and related to absolute threshold. The case of Maxwellian view is compared to normal viewing conditions. The two types of vision are found not to be interchangeable, and the difference is found to vary as a function of the size of entrance pupil of the eye. The findings are discussed in terms of the effects produced by diffraction phenomena and the eye aberrations on the light distribution in the retinal image. (Author)

AD-637 104 **Field 6P**
Istituto Nazionale di Ottica, Florence (Italy).
THE NOISE OF THE VISUAL SYSTEM AND THE ELISABETH LINNE EFFECT.
by Rolando Tittarelli. 1965, 9p
Contract AF 61 (052)-850
Prepared in cooperation with Clinica Oculistica Dell'Universita di Pisa.

Descriptors: (*Vision, Light), Illumination, Recall, Visual perception, Italy.

When a dark-adapted observer looks at a dark field, fluctuating patches of faint brightness, and a diffuse milky network is perceived. When a luminous field of moderate luminance is fixated for a number of seconds, some isolated events are perceived which recall the degeneration of shape of a point-like test-object, so intense as to correspond to a perception probability greater than 95% for red and blue lights and greater than 80% for orange and white lights. The average time interval between two successive events is about 6 sec. It is thought that such events are due to those quantal fluctuations of light incident on the retina, which exceed the liminal increment, correspondingly to a given signal-to-noise ratio. Lastly, the reported effect is discussed and compared to the E. Linne effect. (Author)

AD-637 106 **Field 6P**
Goteborg Univ. (Sweden). Dept. of Physiology.
A PROPOSED DIFFERENTIATED NEURO-EFFECTOR ORGANIZATION IN MUSCLE RESISTANCE VESSELS.
by B. Folkow, B. Oberg, and E. H. Rubinstein.
1964, 12p
Contract AF 61 (052)-732

Descriptors: (*Musculoskeletal system, Blood vessels), (*Autonomic nervous system, Muscles), Vasoactive agents, Nerve fibers, Reflexes, Nerves, Acetylcholine, Neuromuscular transmission, Nervous system, Physiology, Cats, Sweden.

The extent of vasodilatation in skeletal muscle, produced by standardized activations of the sympathetic cholinergic vasodilator fibres from the hypothalamic 'defence area', has been studied during various levels of concomitant vasoconstrictor fibre activity and compared with the effects of standardized close arterial injections of acetylcholine. It was found that the dilator response to hypothalamic stimulation, which was pronounced when the vasoconstrictor fibre activity was inhibited, was more or less completely suppressed when the constrictor activity was enhanced, despite the fact that acetylcholine produced essentially the same degree of vasodilatationin the two situations. Based on these data and recent observations of other authors concerning the distribution of adrenergic fibre terminals to the smooth muscles of the resistance vessels, a hypothesis is advanced implying that the sympathetic nerve fibres and vascular smooth muscles are differentiated into a dual neuro-effector system in skeletal muscles. According to this hypothesis, the smooth muscles in the resistance vessels are arranged in two principal, functionally different sheaths, one inner, myogenically active layer, receiving the main part of the cholinergic vasodilator fibres, surrounded by an outer sheath, where the smooth muscles essentially lack myogenic activity but are subordinated to a strict adrenergic vasocontrictor fibre control. Some implications of the data presented and the hypothesis advanced are discussed. (Author)

AD-637 107 **Field 6P, 6O**
Milan Univ. (Italy). Istituto di Fisiologia Umana.
EFFECTS OF CENTRAL STIMULANTS ON ONSET OF DIAPHRAGM ACTIVITY DURING BREATH HOLDING.
by E. Agostoni, G. Santambrogio, and P. Mognoni. 5 Jul 63, 6p
Contract AF 61 (052)-765, Grant PHS-RF-15

Descriptors: (*Diaphragms (Anatomy), *CNS stimulants), (*Respiration, Diaphragms (Anatomy)), Amphetamines, Purine alkaloids, Carbon dioxide, Hypoxia, Italy.

The effect of d-methylamphetamine, caffeine, and analeptics on the alveolar PCO2 during spontaneous breathing and at the onset of diaphragm activity during breath holding has been studied. After d-methylamphetamine the value of alveolar PCO2 at the onset of diaphragm activity, as well as at the breaking point, is significantly increased, while the ventilation-alveolar PCO2 relationship is not changed. After caffeine the value of the alveolar PCO2 at the onset of diaphragm activity, as well as at the breaking point, is significantly decreased and the ventilation-alveolar PCO2 relationship is significantly shifted to a lower PCO2. The value of alveolar PCO2 at onset of diaphragm activity is significantly decreased by prethcamide, increased by pentylenetetrazol, and not affected by dimefline. The ventilation-alveolar PCO2 relationship was not changed by such analeptics. These data, together with those previously obtained on hypoxia, suggest that factors changing the ventilation-alveolar PCO2 relationship also affect the onset of diaphragm activity, while the onset of diaphragm activity can be changed without affecting the ventilatory response to CO2. (Author)

N66-18389 **Field 6P**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Los Angeles. Dept. of Physiology and Anatomy.
COMPREHENSIVE SPECTRAL ANALYSIS OF HUMAN EEG GENERATORS IN POSTERIOR CEREBRAL REGIONS.
by W. R. Adey, D. Brown, J. M. Rhodes, and D. O. Walter. 1964, 48p
Contract NAS9-1970, Grant NSG-505
NASA-CR-57050
Research supported in part by PHS. grant PHS-NB-2501-04 and Air Force. grant AF-AFOSR-246-63.

Descriptors: *Electroencephalogram (EEG), *Cerebrum, *Human body, *Spectral analysis.

For abstract, see T 66 18.

N66-18391 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Ohio State Univ., Columbus. Dept. of Physiology.
REACTION OF THE CHICK TO ONE ATMOSPHERE OF OXYGEN.

by E. P. Hiatt, H. S. Weiss, and R. A. Wright.
1964. 25p
Grant NSg-295
NASA-CR-60380

Descriptors: *Oxygen, *Animal study, *Atmospheric pressure, *Chicken.

PB-170 649 **Field 6P**
CFSTI Prices: HC$3.00 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE, A L'AIDE D'INDICATEURS NUCLEAIRES (HTO, UREE 14C et 24Na), DU RENOUVELLEMENT DE L'EAU, DE L'UREE ET DU SODIUM DANS LES DIFFERENTES REGIONS DU REIN DE RAT EN DIURESE AQUEUSE ET DE MERION EN DIURESE OSMOTIQUE OU EN OLIGURIE (Study with the Help of Nuclear Indicators (HTO, UREA 14C and 24Na) of the Renewal of Water, Urea and Sodium in Different Parts of the Rat Kidney in Aqueous Diuresis and of the Gerbil Kidneys in Osmotic Diuresis or in Oliguria).
Doctoral thesis in French.
by Claude Pierre Lechene. 24 Jun 65, 45p CEA-R-2933
Text in French: Attached summary in English.

Descriptors: (*Kidneys, Physiology), (*Urea, Biosynthesis), Rodents, Sodium, Osmosis, Water, Urine, Radioactive isotopes, Tracer studies, Pathology, France.

In the kidney of the gerbil in oliguria there exists a cortico-papillary gradient in the concentration of the sodium and of the urea; this gradient disappears in the gerbil kidney in osmotic diuresis or in the rat kidney in aqueous diuresis; in these three states of diuresis there is no significant difference in the potassium concentration between the surface and interior regions of the kidneys. Kinetic studies using tritiated water, urea 14C and 24Na show that water and urea in the interior regions of the kidney are only renewed very slowly (1 h) whereas the sodium is rapidly changed (1 mn). These results can be explained using WIRZ's theory concerning the mechanism of the counter-current concentration of urine. Furthermore, the evolution of the specific radio-activity of urea 14C is favorable for a cortical synthesis of urea. (Author)

AD-636 617 **See Field 20F**

AD-636 634 **See Field 6E**

AD-637 034 **See Field 5J**

6Q. PROTECTIVE EQUIPMENT

AD-636 398 **Field 6Q**
CFSTI Prices: HC$2.00 MF$0.50
Army Natick Labs., Mass. Mechanical Engineering Div.
INVESTIGATION OF THE PERFORMANCE OF AN OPEN-FLAME CONVECTOR.
Technical rept.
by Alexander Levin. Jun 66, 36p
Proj. 7X89-20-003
USA-NLABS-TR-66-50-ME

Descriptors: (*Heaters, *Protective clothing), Performance (Engineering), Body temperature, Heat transfer, Flames, Ignition, Fuel consumption, Safety.

The convector investigated was an experimental prototype designed as a body warmer to heat the space between the wearer's body and his outer apparel. Three prototypes were investigated under a series of conditions including standard, low-temperature, and operational. Under these conditions, data on ignition, fuel regulation, fuel consumption, convector thermal capacitance, and safety were obtained. Results of the investigation showed that operation of the prototype convectors can be regulated for consistent operation within 9 percent. If the fuel rate is monitored and controlled, the convector thermal capacitance may be regulated within 5 percent to assure the constancy of this variable when applied to human test subjects. Although there is a potential hazard of fire, heat injury and toxicity from use of the open-flame convector as a body warmer, its performance within safety threshold limits is obtainable. The fire and heat injury hazards are minimized when the fuel regulating valve is prewarmed at low temperatures and the burner is ignited in a shielded enclosure. Carbon monoxide concentration was reduced to acceptable threshold limits, less than 0.01 percent, when the convectors were operated at low-temperature operational conditions. (Author)

AD-636 423 **Field 6Q**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.
DEVELOPMENT OF REVISED SIMPLEX FABRIC FOR SUMMER FLYING GLOVES.
by Hal E. Brockmann. 1 Jul 66, 10p NADC-MR-6607
Task RAE-20J-010-2021-F012-10-02

Descriptors: (*Flight clothing, *Gloves), Fire resistant textiles, Fibers, Leather, Manufacturing methods, Standards.

Identifiers: Simplex yarns.

An improved Simplex knitted fabric was developed for use in summer flying gloves which would effect better protection in the event of exposure to flames and reduce or eliminate the difficulties encountered with the filament Simplex fabric. The fabric was to conform to all the requirements needed for comfort, serviceability and protection. All manufacturing techniques utilized in this effort were to conform to and be compatible with standard commercial methods for reproducing the finished product. The primary difficulties encountered in the fleet evaluation of the filament glove were limited to seam slippage and glove fit. Since the seam slippage presents a problem in serviceability, it is proposed that the yarn structure be modified from a continuous filament yarn to a yarn spun from short length staple fibers. This in itself would effect a greater degree of surface cohesiveness within the fabric structure and thus help to hold the seams in place. As far as the glove fit in the thumb area was concerned, a simple modification of the pattern accomplished the change.

AD-636 973 **Field 6Q**
CFSTI Prices: HC$1.00 MF$0.50
Naval Supply Research and Development Facility, Bayonne, N. J.
SHIPBOARD EVALUATION OF EXPERIMENTAL MODEL I BUOYANT INSULATED COLD WEATHER JACKETS.
by Caesar J. Zemme, and John Silvia. May 66, 25p
Projs. RENS-14-02-001-00-1, T-F015

Descriptors: (*Clothing, *Thermal insulation), Shipborne, Buoyancy, Polyvinyl chloride, Protective clothing, Tests.

Identifiers: Evaluation.

A service evaluation of experimental buoyant permeable and impermeable cold weather jackets was conducted during two consecutive winters aboard aircraft carriers and destroyers. The extended evaluation was conducted to assess the protective properties, fit, and durability (especially of the buoyant insulation) of the garments. The jackets were insulated with unicellular polyvinyl chloride foam (PVC) which provided sustained emergency buoyancy as an integral component of the jackets. This feature is not provided by the standard Navy A-2 Intermediate Cold Weather Jacket and A-1 Extreme Cold Weather Jacket when the liner is removed. Test results indicated that the new jackets furnished satisfactory, functional utility and environmental protection and that the PVC foam was suitable for use as an insulating material. The tests also revealed certain design short-comings of the impermeable jacket which will require correction. (Author)

6R. RADIOBIOLOGY

AD-636 571 **Field 6R**
CFSTI Prices: HC$4.00 MF$1.00
Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.
FEASIBILITY STUDY FOR A MOBILE LABORATORY TO EVALUATE ENVIRONMENTAL RADIATION CONTAMINATION.
Jan 66, 141p EGG-S-253-R
Contract DA-49-146-XZ-257
AFRRI-CR66-1

Descriptors: (*Radiological contamination, *Laboratories), Food, Water, Mobile, Feasibility studies, Gamma rays, Environment, Health physics.

A study of the laboratory requirements necessary for evaluating radioactive contamination of food, water and biological specimens has been completed. From the information obtained, a mobile laboratory facility with the capability of qualitative and quantitative analyses of millimicrocurie amounts of alpha, beta and gamma emitting radioisotope contaminants was designed. The laboratory utilizes sufficient shielding so all analyses can be performed in a two milliroentgen per hour gamma radiation field and where the average gamma energy is one mev. The entire laboratory including all electronics, detectors, shielding, power supplies, motor generator, laboratory structure and hardware, and transport container weighs less than two thousand pounds and has a total power requirement (115 volts a.c. - 60 cycle) of four kilowatts. (Power is furnished by a self-contained gasoline driven motor generator.) The laboratory in its cubic transport container, six feet on a side, is thus readily transportable either by helicopter or truck. (Author)

AD-636 585 **Field 6R**
CFSTI Prices: HC$4.00 MF$0.75
Foreign Technology Div., Wright-Patterson AFB, Ohio.
REACTIVITY OF ADRENARGIC AND CHOLINERGIC RECEPTORS IN ACUTE RADIATION.
by Andrizej Danysz. 4 Apr 66, 102p FTD-TT-65-941
TT-66-61904
Odczynowosc Zakonczen Adrenergicznych i Cholinergicznych w Ostrej Chorobie Popromiennej, edited trans. of Akademia Medyczna. Roczniki. Supplement (Poland) n6 p1-84 1961.

Descriptors: (*Autonomic nervous system, *Radiation sickness), (*Radiation effects, Autonomic nervous system), Chemoreceptors, Morphology (Biology), Toxicity, Drugs, Amines, Electrocardiography, Epinephrine, Adrenal glands, Intestines, Cholinesterase, Atropine, Guinea pigs, Mice, Poland.

For abstract, see T 66 18.

AD-636 646 **Field 6R, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Uppsala Univ. (Sweden). Gustaf Werner Inst.
RADIONUCLIDES PRODUCED IN MAN BY HIGH ENERGY PROTONS.
by I. B. Haller, and B. Jung. 18 Nov 63, 34p
Scientific-1
Contract AF 61 (052)-740

Descriptors: (*Radiological dosage, *Protons), (*Nuclear reactions, Radiobiology), Spallation, Radioactive decay, Radiation effects, Brain, Humans, Sweden.

The activity of radionuclides produced by 150 MeV protons in targets of the elementary composition of the human brain and the whole human body was calculated from known or estimated spallation cross sections. The absorbed radiation dose due to delayed nuclear disintegrations was also estimated. (Author)

AD-636 647 **Field 6R, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Uppsala Univ. (Sweden). Gustaf Werner Inst.
CROSS SECTION FOR THE PRODUCTION OF (30)P FROM (31)P BY PROTONS OF ENERGIES BELOW 190 MeV.
by P. Malborg. Dec 64, 26p Scientific-3
Contract AF 61 (052)-740

Descriptors: (*Radiological dosage, *Protons), (*Nuclear reactions, Radiobiology), Tissues (Biology), Spallation, Radioactive decay, Radiation effects, Sweden.

The excitation function for the production of (30)P from (31)P by protons between 20 and 190 MeV has been measured. The sum of the cross sections of the reactions leading to the production of (30)P from (31)P was found to rise from threshold to a maximum of 50 to 100 millibarns between 15 and 50 MeV. At higher energies there was a continuous decrease to (32 plus or minus 5) millibarns at 100 MeV and (25 plus or minus 4 millibarns at 180 MeV. The result has some bearing upon the significance of (30)P as a contributor to the delayed radiation dose after irradiation of tissues with high-energy protons. The conclusion is drawn that (30)P should not be regarded important from this aspect as compared with the dominating radionuclides (15)O, (11)C and (13)N. (Author)

AD-636 648 **Field 6R, 6E**
CFSTI Prices: HC$1.00 MF$0.50
Uppsale Univ. (Sweden). Gustaf Werner Inst.
RADIOACTIVITY OF HUMAN BLOOD AS A MEASURE OF INTEGRAL DOSE FROM HIGH ENERGY PROTONS.
by Sten Graffman, and Bo Jung. Dec 64, 15p Scientific-4
Contract AF 61 (052)-742

Descriptors: (*Blood, *Radioactivity), Radiotherapy, Dosage, Protons, Neoplasms, Radiation effects, Sweden.

The carbon 11 -radioactivity of blood samples taken from patients undergoing tumour therapy with high energy protons was measured. The results indicate that the blood radioactivity may be a good measure of integral radiation dose from high energy protons. Future developments are discussed briefly. (Author)

AD-636 652 **Field 6R, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Uppsala Univ. (Sweden). Gustaf Werner Inst.
RADIONUCLIDE PRODUCTION AND EFFECTS OF NUCLEAR REACTIONS ON DOSE FROM 193 MeV PROTONS STOPPED IN TISSUE.
by Bo Jung. Nov 64, 37p Scientific-2
Contract AF 61 (052)-740

Descriptors: (*Radiological dosage, *Protons), (*Nuclear reactions, Radiobiology), Charged particles, Penetration, Tissues (Biology), Spallation, Radioactive decay, Radiation effects, Sweden.

The contribution to the absorbed dose in tissue-equivalent material from secondary ionizing particles produced in nuclear reactions in the stopping of 192 MeV protons has been estimated as a function of penetration depth. The yield of radionuclides of sufficient half-life to permit detection has been calculated. The calculations are based on a literature survey of empirical cross sections for proton-induced reactions in oxygen, carbon and hydrogen. (Author)

AD-636 909 **Field 6R, 6A**
Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.
EFFECT OF WHOLE-BODY X-RAY IRRADIATION ON PHOSPHOLIPIDS OF RAT LIVER PARTICULATE FRACTIONS.
by H. P. Schwarz, L. Dreisbach, E. Polis, B. D. Polis, and E. Soffer. 1 Apr 65, 14p NADC-Mr-6520
Task R360-FR-102/2021/R01-101-01
NAVMED-MR005.13-0002.14-4
Prepared in cooperation with Philadelphia General Hospital, Pa., Dept. of Biochemistry, Contract NYO-1864-20 and Grant PHS-GM-9698.

Descriptors: (*Phospholipids, *Radiation effects), (*Liver, Phospholipids), (*Mitochondria, Phospholipids), Granules, Whole body radiation, X-rays, Glycerols, Tracer studies, Proteins, Metabolism.

Identifiers: Phosphatidyl glycerol.

Examination of phospholipids of heavy mitochondrial, and other particulate fraction of livers from whole-body X-ray irradiated fasted rats and controls showed that the increase of phosphatidylglycerol previously reported actually took place in fractions with 'lysosomal' and 'microsomal' properties. Study of the in vivo incorporation of (p32) orthophosphate into mitochondrial phospholipids demonstrated that phosphatidyl glycerol is more strongly labeled than cardiolipin and that it retains a greater part of that label much longer in mitochondria from the irradiated rats than from controls. It is concluded that phosphatidyl glycerol plays a more active metabolic role than cardiolipin and that it may be involved in protein metabolism, which can be affected by ionizing irradiation. (Author)

CONF-651109 **Field 6R, 18D, 20G, 18F**
CFSTI Prices: HC$6.75 MF$2.75
Division of Operational Safety (AEC), Washington, D. C.
PROCEEDINGS OF THE USAEC SYMPOSIUM ON ACCELERATOR RADIATION DOSIMETRY AND EXPERIENCE.
1965, 662p
Prepared in cooperation with Division of Research (AEC), Washington, D. C., Division of Biology and Medicine (AEC), Washington, D. C., and Brookhaven National Laboratory, Upton, New York, November 3-5, 1965.

Descriptors: (*Particle accelerators, Health physics), (*Health physics, Symposia).

For abstract, see N 20 16.

LA-3394 **Field 6R, 18I**
CFSTI Prices: HC$3.00 MF$0.50
Los Alamos Scientific Lab., N. Mex.
RADIATION MEASUREMENTS OF THE EFFLUENT FROM THE NRX A-2 AND NRX A-3 REACTORS.
by R. W. Henderson, and O. W. Larson. Jan 66, 51p
Contract W-7405-eng-36

Descriptors: (*Radiation measurement systems, Nuclear power plants), (*Nuclear power plants, Instrumentation).

For abstract, see N 20 16.

N66-12462 **Field 6R**
CFSTI Prices: HC$4.00 MF$0.75
Milan Univ. (Italy). Instituto di Farmacologia e di Terapia.
SIMULATED COSMIC-RAY IRRADIATION WITH 600 ME V PROTONS. VOLUME 1, PART 2.
by A. Pasinetti. Nov 65, 118p HER/AP-2-65

Descriptors: *Mouse, *Biological effect, *Proton irradiation, *Radiation effect.

N66-13181 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Danish Atomic Energy Commission, Risoe. Research Establishment.
THERMOLUMINESCENCE READ-OUT INSTRUMENT FOR MEASUREMENT OF SMALL DOSES.
by J. Lippert, and V. Mejdahl. May 65, 14p RISO-101

Descriptors: *Dosimetry, *Phase modulation, *Radiation dose, *Thermoluminescence, *Gamma radiation.

N66-14359 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
THE FEASIBILITY OF A NEW PROCEDURE FOR BIOLOGICAL DOSIMETRY.
by H. Brohee, S. Kellerer, J. F. Whitfield, and T. Youdale. 1965, 35p EUR-2505.E

Descriptors: *Biology (Gen), *Radiation dose, *Dosimetry.

N66-15782 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Medical Biological Lab., RVO-TNO, Ryswijk (Netherlands).
TWO-COMPONENT RADIATION EFFECT ON STRONTIUM 85 ABSORPTION BY THE RAT ILEUM IN SITU.
by C. S. Marcus, and O. Vos. Oct 65, 15p

Descriptors: *Animal study, *Radiation effect, *Strontium, *Intestine, *Radioactive isotope, *Rat.

PB-170 655 **Field 6R**
CFSTI Prices: HC$3.00 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
ETUDE CLINIQUE ET SYMPTOMATOLOGIQUE CHEZ LE PORC SOUMIS A UNE IRRADIATION GAMMA TOTALE A DOSE LETALE (Clinical and Symptomatological Study of Pigs Subjected to a Lethal Dose of Integral Gamma Irradiation).
by Marcel Vaiman, Jean-Louis Guenet, Jean Maas, and Pierre Nizza. 1966, 26p CEA-R-3001
Text in French; attached summary in English.

Descriptors: (*Radiation effects, Swine), Lethal dosage, Gamma rays, Radiological dosage, Hematology, Blood circulation, Cytology, Bone marrow, Hemopoietic system, France.

Results are given of a clinical and haematological study made on a corsican species of pigs wholly exposed to an approximately lethal dose of irradiation. The aim of this work was to examine the changes in the irradiation syndrome of irradiation for pigs and to make it thus possible to devise further experiments, in particular in the therapeutic field. The dose received was 285 rads (measured as the absorption in the vertical antero-posterior mesial plane). The study was concerned essentially with: (1) The cyto-haematological changes in the blood circulating immediately after irradiation, for the various cellular descendants; the variations of these changes were followed right up to death. (2) The changes in the medullary cytology after irradiation (variations in the myelogram and attempts to evaluate the cellularity of the bone marrow). (Author)

SC-CR-66-2010 **Field 6R, 18H**
CFSTI Prices: HC$3.00 MF$0.50
Travelers Research Center, Inc., Hartford, Conn.
PARTICLE FALLOUT AND DISPERSION IN THE ATMOSPHERE.
Quarterly rept. no. 2, 1 Sep-30 Nov 65.
by K. D. Hage, and P. S. Brown. Dec 65, 51p
Contract AT (29-1)-789
Subcontracted by Sandia Corp. Contract 48-2417.

Descriptors: (*Radioactive fallout, Scattering), (*Air pollution, Radioactive fallout).

For abstract, see N 20 16.

AD-636 913 **See Field 6C**

6S. STRESS PHYSIOLOGY

AD-636 317 **Field 6S, 5J, 22A**
CFSTI Prices: HC$2.00 MF$0.50
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
DIAL-READING PERFORMANCE AS A FUNCTION OF FREQUENCY OF VIBRATION AND HEAD RESTRAINT SYSTEM.
Final rept., Mar 64-Jan 65.
by Harvey A. Taub. Apr 66, 28p VH-1838-E-2
Contract AF 33 (657)-11729
Proj. AF-7231
Task 723101
AMRL-TR-66-57

Descriptors: (*Astronauts, Performance (Human)), (*Stress (Physiology), Astronauts), Vibration, Atmosphere entry, Reading, Display systems, Head, Safety harness, Frequency, Functional analysis.

Dial-reading performance under vibration was investigated at 6, 11, and 15 cps, + 1 Gx (acceleration vector of gravity) plus or minus 1.1 gx (vibration) with three X-axis head restraint configurations (a rigid restraint system, a piston-spring damper system and a spring (only) isolator system) and two Z-axis head restraint configurations (head locked in Z-Axis and head allowed to move freely in the Z-axis). Ten subjects were tested. The results indicated that less decrements in performance occurred at 6 cps than at 11 and 15 cps. Further, the use of the X-axis piston-spring damper isolation system resulted in significantly less errors as compared to the X-axis rigid restraint system. At 15 cps, where all three X-axis head configurations could be compared, there was no difference in performance with the piston-spring and spring (only) systems, while both resulted in less errors than the rigid system. Finally, the Z-axis restraint system had an effect upon performance only at 15 cps. The data suggested that allowing the head to move freely in the Z-axis at 15 cps resulted in less errors than when the head was locked in the Z-axis. (Author)

AD-636 474 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
THE EFFECT OF ACCELERATIONS ON THE VESTIBULAR ANALYZER: BIBLIOGRAPHY.
by Janice L. Smith. 3 Jun 66, 25p ATD-66-62
TT-66-61894
Rept. on Surveys and Foreign Scientific and Technical Literature.

Descriptors: (*Space medicine, Vestibular apparatus), (*Vestibular apparatus, Bibliographies), (*Acceleration tolerance, Vestibular apparatus), Stress (Physiology), Otorhinolaryngology, Weightlessness, Electroencephalography, Ear, Cerebral cortex, Stimulation, Reflexes, Motion sickness, Space perception, Training, Dogs, USSR.

The bibliography was compiled from Soviet open sources published 1955-1966 together with 5 Western sources. It is the first report in a series and deals with the effect of angular, impact, and Coriolis accelerations on the vestibular mechanism. The bibliography is divided into two sections. The first section consists of 112 items which are considered of primary interest. The second part contains 27 items considered of secondary interest because they contain elementary or background information or had only a few relevant paragraphs. Pertinent information includes: diagnostic value of labyrinthine reactions, changes in the frequency spectrum of an encephalogram during vestibular and optokinetic stimulation, cortical regulation of vestibular reactions, stimulation of the vestibular apparatus of a dog, development of conditioned vestibular reflexes, biological and physiological studies in rocket and satellite flights, physiological effects of gravitation, spatial orientation, equipment for study of the vestibular analyzer, effect of prolonged acceleration, motion sickness, vestibular training. (Author)

AD-636 723 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.
PULMONARY FUNCTION IN MAN UNDER PROLONGED ACCELERATION II. CORRELATION OF ARTERIAL BLOOD OXYGEN SATURATION WITH VENTILATION AND GAS BEING BREATHED.
Final rept.
by Frederic C. Hoppin Jr, and Raymond J. Sever.
31 Dec 65, 23p NADC-MR-6519
Task RA150J-059/2021/F022-01-03

Descriptors: (*Acceleration tolerance, *Respiration), Blood analysis, Oxygen, Volume, Lungs, Ear, Oximeters.

Arterial blood oxygen saturation was studied by ear oximetry in 8 subjects undergoing prolonged forward (+Gx) acceleration. The effects on saturation of voluntary breathing patterns and the composition of the inspired gas were noted. Under +4Gx saturation levels were stable after two minutes. The degree of unsaturation could be modified to a small extent by voluntary breathing efforts. The level of saturation reached correlated significantly with the minute volume breathed. In contrast, under +8Gx saturation levels were significantly lower and were still falling after two minutes. Saturation levels were not significantly changed by voluntary breathing efforts and there was no significant correlation between level of saturation reached and minute volume breathed. Breathing of oxygen delayed the onset of arterial blood oxygen unsaturation. After two minutes under +8Gx, levels were 20% higher when the subjects breathed oxygen than when they breathed air. When subjects changed from air to oxygen or from oxygen to air on attaining peak acceleration, the effects of the 'prebreathed' gas were apparent for as long as two minutes, suggesting that the prebreathed gas was effectively trapped in some parts of the lung. (Author)

AD-636 795 **Field 6S, 5J**
School of Aerospace Medicine, Brooks AFB, Tex.
EFFECTS OF CONGENITAL FELINE CEREBELLAR HYPOPLASIA ON DEVELOPMENTAL BEHAVIOR AND THE VESTIBULAR SYSTEM.
by Patrick J. Dowd. Jan 66, 13p SAM-TR-65-271

Descriptors: (*Cerebellum, Anomalies), (*Vestibular apparatus, Reflexes), Brain, Behavior, Pathology, Nystagmus, Vision, Positioning reactions, Ear, Acceleration tolerance, Cats.

Emphasis is made of the important role of the brain-stem vestibular nuclei in the interrelations of the vestibulo-ocular reflex arc system when the cerebellar structures are not intact, as in the cerebellar hypoplastic cats studied in this report. It appears that the vestibulo-ocular reflex is not dependent on the cerebellum. The gravity receptors of the utricle and sacculenamely, the otoliths--appear to be dependent and require cerebellar control. The latter concept was demonstrated by the animals' inability to correct their position in falling when blindfolded. The influence of the cerebellum in equalizing the tonus of lower reflex mechanisms is apparent from this report. The role of vision for placing reactions and for labyrinthine and body-righting reflexes is quite important in such familial defective animals. These findings suggest necessary modifications of past concepts concerning cerebellar control of the vestibular sensory and motor system, as in studies by Allen and Fernandex (1), Cranmer (5), Fernandex et al. (10), Margaria (15), and Strong (18). (Author)

AD-636 797 **Field 6S**
School of Aerospace Medicine, Brooks AFB, Tex.
THE INFLUENCE OF MANNED SPACE FLIGHT ON CARDIOVASCULAR FUNCTION.
by Lawrence E. Lamb. Jan 66, 20p SAM-TR-66-212
Resumes in French and German.

Descriptors: (*Cardiovascular system, *Space medicine), Space flight, Manned, Confined environments, Weightlessness, Exercise, Posture, Acceleration tolerance.

Identifiers: Orthostasis.

Manned space flight alters cardiovascular function. Confinement and weightlessness cause function changes similar to inactivity, designated as cardiovascular deconditioning. This includes decreased exercise and orthostatic tolerance. The influence of weightlessness as a separate environmental factor cannot yet be determined since manned space flights involve multiple changes in environmental factors that also effect cardiovascular function. Preliminary can tolerate the weightlessness of space flight for at least one month. (Author)

AD-636 911 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
PHYSIOLOGIC EFFECTS OF AN 18-HOUR FLIGHT IN F-4C AIRCRAFT.
Final rept., 1 Dec 64-23 Aug 65.
by Edward F. Kramer Jr, Henry B. Hale, and Edgar W. Williams. 11 Apr 66, 15p SAM-TR-66-59
Task 775801
Prepared in cooperation with Tactical Hospital (836th TAC), MacDill AFB, Fla.

Descriptors: (*Fatigue (Physiology), *Aviation medicine), Physiology, Pilots, Urine, Excretion, Corticosteroid agents, Alcohols, Potassium, Metabolism, Flight, Stress (Physiology).

Identifiers: F-4 aircraft, Hydroxycorticosteroids.

Physiologic assessment was performed by means of postflight urinalysis for 8 pilots who flew F-4C aircraft for 18 hours. Flight effects were neither numerous nor of large magnitude, nor were the pilots unduly fatigued. The flight-induced, physiologic changes included: (1) increased 17-hydroxycorticosteroid excretion, which implies adrenocortical stimulation, and (2) decreased excretion of uric acid, potassium, and urine, which suggests metabolic depression. (Author)

AD-636 989 **Field 6S, 6G**
CFSTI Prices: HC$2.00 MF$0.50
Naval Medical Research Inst., Bethesda, Md.
COMPARISON OF PHYSIOLOGICAL CHANGES DURING LONG TERM IMMERSION TO NECK LEVEL IN WATER AT 95, 85, AND 75F.
Research rept.
by E. Reeves, J. W. Weaver, J. J. Benjamin, and C. H. Mann. Aug 66, 29p
NAVMED-MF011.99-1001-9

Descriptors: (*Stress (Physiology), Underwater), Tolerances (Physiology), Survival, Seas, Heat transfer, Body temperature, Physiology, Water, Metabolism.

Identifiers: Water immersion.

The experiment was designed to evaluate the physiological changes which result from immersion of subjects in water to neck level for 24 hours at water temperatures of 95, 85, and 75F. It had previously been determined that immersion of subjects in water below 95F resulted in a heat loss from the body which was compensated by an increase in metabolic rate. Other changes in blood morphology and blood electrolytes had been shown to occur concomitantly with increased urinary excretion of water and electrolytes. Since the previous studies had been carried out over a relatively short period of time, the present experiments were designed to evaluate such changes over a 24-hour period, not only at 95F water tem-

perature but at lower water temperatures as well. It was found that the three subjects increased their metabolic rate when immersed in 85F water and were able to maintain a 'normal' deep body temperature over a 24-hour period. When immersed in the 75F water, the increased oxygen consumption due to shivering was insufficient to maintain deep body temperature. In addition, the physiological discomfort of immersion at 75F and 'the spiritual failure' of those subjects caused the experiments to be terminated within 12 hours. The changes in the morphology and electrolyte content of the blood together with the hemoconcentration were associated with increased urinary water and electrolyte excretion and were progressive with time. (Author)

AD-637 029 **Field 6S**
CFSTI Prices: HC$1.60 MF$0.50
European Office of Aerospace Research, Brussels (Belgium).
FACTOR ANALYSIS OF SPACE ORIENTATION.
Technical note.
17 Mar 61, 20p

Descriptors: (*Stress (Physiology), *Space medicine), (*Posture, Stress (Physiology)), Gravity, Vision, Space perception, Factor analysis, Belgium.

Informations from the visual system suffice to set the subjective vertical according to visual clues, up to radial accelerations of 3 g. (The distance between test subject and prominent construction features in the centrifuge room was 14 m maximally). The positioning of the subjective vertical to the direction of the gravitational force is facilitated by keeping body and head in the direction of the gravitational force. At 3 g the visual orientation becomes increasingly more difficult, under the experimental conditions used. The difference between subjective vertical and vector of forces is greatest when body and head are fixed in the direction of the gravitational force and no visual orientation is available. (Author)

AD-637 116 **Field 6S**
Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
CIRCULATORY ADAPTATION TO THE REQUIREMENTS OF LIFE UNDER MORE THAN ONE ATMOSPHERE OF PRESSURE.
Interim rept.
by Karl E. Schaefer. 14 Dec 65, 35p Rept. no. 463
NAVMED-MR005.14-3100-1.06

Descriptors: (*Diving, *Cardiovascular system), Barometric pressure, Adaptation (Physiology), Stress (Physiology), Poisoning, Carbon dioxide, Anoxia, Nitrogen, Decompression sickness.

Contents: Physiological changes under conditions of swimming and diving. Anatomical and physiological adaptation of diving animals. Cardiovascular and respiratory functions and adaptations in skin diving. Hazards of diving and related adaptive changes. The thoracic squeeze. Carbon dioxide intoxication and adaptation in diving. Skin diving. Submarine escape (free and Buoyant ascent). Scuba diving. Deep-sea diving. Nature of CO2 adaptation. Anoxia. Compression. Cardiovascular effects of increased pressure. Oxygen toxicity. Oxygen effects at one atmosphere. Oxygen paradox. Effects of oxygen in excess of one atmosphere. Pathological changes induced by oxygen. Acclimatization to oxygen. Therapeutic use of oxygen under high pressure. Nitrogen narcosis. Exposure to synthetic atmospheres at normal and increased pressures. Air embolism. Decompression sickness. Etiology of decompression sickness. Bubble formation. Theoretical relation of symptoms to bubble size. Protection from decompression sickness. Adaptive changes related to decompression sickness.

N66-11753 **Field 6S**
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
PROCEEDINGS OF A RESEARCH CONTRACTORS CONFERENCE.
1964, 156p NASA-CR-67948

Descriptors: *Aerospace medicine, *Bed rest, *Hemodynamic response, *Physiological response, *Proton irradiation.

For abstract, see T 66 18.

N66-11768 **Field 6S**
CFSTI Prices: HC$2.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
CLINICAL PATHOLOGICAL CORRELATIONS IN SQUIRREL MONKEYS AFTER SUPPRESSION OF SEMICIRCULAR CANAL FUNCTION BY STREPTOMYCIN SULFATE.
by A. Graybiel, M. Igarashi, and M. E. McLeod.
14 Jul 65, 37p NSAM-940
Contract NASA Order R-93
NASA-CR-68007

Descriptors: *Monkey, *Semicircular canal, *Streptomycin, *Aerospace medicine, *Pathological effect.

N66-14342 **Field 6S**
CFSTI Prices: HC$2.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
EXPERIMENTAL ANIMAL DECOMPRESSIONS TO LESS THAN 2 MM. HG ABSOLUTE (PATHOLOGIC EFFECTS).
by R. W. Bancroft, J. E. Dunn, J. W. Foft, and W. Haymaker. Jun 65, 14p

Descriptors: *Dog, *Pathology, *Tissue, *Decompression.

6T. TOXICOLOGY

AD-461 388 **Field 6T, 6O**
CFSTI Price: HC$1.60
Florida Univ., Gainesville. Coll. of Medicine.
THE EFFECT OF DIMERCAPTOPROPANOL (BRITISH ANTI-LEWISITE) ON THE TOXICITY OF OXYGEN AT SIX ATMOSPHERES' PRESSURE ON WHITE MALE RATS.
Research rept., Jun 63-Jun 64.
by Peter V. Van Tassel. Mar 65, 12p
Contract AF 41 (609)-1553
Task 775801
SAM-TR-65-11

Descriptors: (*Anticonvulsants, Thiols), (*Oxygen, Poisoning), (*Toxicity, Oxygen), Propanols, High pressure research, Enzymes, Inhibition, Brain, Rats, Chemotherapeutic agents.

Six groups of ten white male Holtzman rats were given doses of 10, 25, 40, 50, 75, and 100 mg./kg., respectively, of British anti-lewisite. Time of onset of the first convulsions after the animals were exposed to 6 atmospheres of oxygen and the survival time were compared with those of fifty control animals. As the dose was increased to 40 mg./kg., both the onset of convulsions and the survival time were increased to a peak and then decreased with further increase in dosage until they reached almost control levels again at the dose of 100 mg./kg. Another group of animals was given equivalent doses of the vehicle in which British anti-lewisite was dissolved and of an inactive analog of British anti-lewisite (glycerin). It was shown that the effect seen was not due to either the vehicle or the inactive analog. (Author)

AD-636 903 **Field 6T, 6C**
Army Biological Labs., Frederick, Md.
SOME CHEMICAL AND PHYSICAL PROPERTIES OF PARALYTIC SHELLFISH POISONS RELATED TO TOXICITY. II.
by Edward J. Schantz. 15 May 61, 10p

Descriptors: (*Pelecypoda, Poisons), (*Shellfish, Toxins + antitoxins), Paralysis, Food poisoning, Toxicity, Chemical analysis.

For abstract, see T 66 18.

AD-636 910 **Field 6T, 21I**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
PHARMACOLOGY AND TOXICOLOGY OF PROPELLANT FUELS. BORON HYDRIDES.
Aeromedical Reviews.
by James H. Merritt. Jun 66, 13p Review-3-66

Descriptors: (*Boranes, Toxicity), (*Rocket propellants, Toxicity), Pharmacology, Toxicology, Combustion products, Pentaboranes, Decaboranes, Poisoning, Therapy, Reviews.

For abstract, see T 66 18.

AD-637 115 **Field 6T**
CFSTI Prices: HC$1.00 MF$0.50
Pacific Missile Range, Point Mugu, Calif.
EXPERIMENT ON EFFECT OF ALCOHOL ON UPTAKE OF CARBON MONOXIDE BY THE BLOOD.
Technical memo.
by S. Goren. 5 Aug 66, 23p PMR-TM-66-5

Descriptors: (*Alcohols, Poisoning), (*Carbon monoxide, Toxic tolerances), Guinea pigs, Metabolism, Hemoglobin, Ammonium compounds, Chlorides, Sodium compounds, Carbonates.

Identifiers: Ammonium chloride, Sodium bicarbonate.

Work was performed at the Pacific Missile Range to test the hypothesis that alcohol could affect the uptake of carbon monoxide in humans, possibly producing an effect more toxic than either alone. A preliminary experiment was performed to determine the effect of carbon monoxide on four small groups of guinea pigs fed a standard diet plus alcohol and other drugs. The results indicated that small amounts of alcohol over a comparatively long period slow the lethal saturation time of hemoglobin with the carbon monoxide. Alcohol and carbon monoxide appear antagonistic under such conditions. Ammonium chloride appears to cause an increase in the uptake of carbon monoxide. This is evident either as an acceleration of carbon monoxide combining time with hemoglobin or a greater total carbon monoxide hemoglobin level attained. It appears that both factors are operative. Sodium bicarbonate does not appear to contribute any beneficial effect on the uptake of carbon monoxide because alcohol has apparently not increased the carbon monoxide uptake rate under conditions of the experiment (i.e., low-level chronic exposure). (Author)

7. CHEMISTRY

UCRL-14767 **Field 7-, 7A**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
ANALYTICAL CHEMISTRY SECTION PROGRESS REPORT, JANUARY 1-DECEMBER 31, 1965.
by J. E. Harrar. 1965, 35p
Contract W-7405-eng-48

Descriptors: (*Chemical analysis, Instrumentation), (*Vacuum apparatus, Chemical analysis).

For abstract, see N 20 16.

7A. CHEMICAL ENGINEERING

ANL-7066 **Field 7A**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.

REMOVAL OF PLUTONIUM HEXAFLUORIDE FROM CELL EXHAUST AIR BY HYDROLYSIS AND FILTRATION.
by R. W. Kessie, and D. Ramaswami. Dec 65, 70p
Contract W-31-109-eng-38

Descriptors: (*Plutonium compounds, Fluorides), (*Removal, Plutonium compounds).

For abstract, see N 20 16.

ANL-7128 **Field 7A**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
DESIGN AND OPERATION OF A PILOT-PLANT GETTERING SYSTEM OF TITANIUM-METAL SPONGE FOR REMOVAL OF NITROGEN FROM ARGON.
by M. L. Kyle, J. D. Arntzen, and L. F. Coleman. Jan 66, 41p
Contract W-31-109-eng-38

Descriptors: (*Controlled atmospheres, Degasification), (*Argon, Degasification), Nitrogen, Titanium.

For abstract, see N 20 16.

RL-SEP-673-Rev-1 **Field 7A**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
CHLORINATION REACTIVITY OF PLUTONIUM OXIDE PREPARED IN A SCREW CALCINER.
by H. T. Fullam, and T. S. Soine. Dec 65, 16p
Contract AT (45-1)-1350

Descriptors: (*Plutonium compounds, Oxides), (*Chlorination, Plutonium compounds).

AD-636 454 **See Field 11J**

AD-636 639 **See Field 7D**

ANL-7204 **See Field 18I**

PB-170 956 **See Field 5C**

UCRL-14767 **See Field 73**

7B. INORGANIC CHEMISTRY

AD-636 365 **Field 7B**
Minnesota Univ., Minneapolis. Dept. of Chemistry.
ELECTROMOTIVE FORCE, RAMAN, AND NUCLEAR MAGNETIC RESONANCE STUDIES ON THE INTERACTION OF CHLORIDE AND BROMIDE IONS WITH THE DIMETHYLTIN (IV) ION. INNER- AND OUTER-SPHERE COMPLEXES.
by Humphrey N. Farrer, Mary Mercy McGrady, and R. Stuart Tobias. 21 May 65, 10p
Grants AF-AFOSR-691-65, NSF-GP-653
Proj. AF-9710
Task 971001
AFOSR-66-0307

Descriptors: (*Complex compounds, Chemical reactions), (*Tin compounds, *Metalorganic compounds), Chlorides, Bromides, Electrochemistry, Raman spectroscopy, Nuclear magnetic resonance, Chemical bonds, Chemical equilibrium, Catalysis, Acid-base reactions, Crystal lattices.

Identifiers: Dimethyl tin compounds, Electromotive force, Organotin compounds, Spin-spin coupling.

The complexing of (CH3)2Sn (+2) (aq) by C1 (-) and Br (-) in aqueous solution was studied by e.m.f., Raman, and proton n.m.r. measurements. By the use of the cells, glass electrode /0.2 M H (I), 2.8 M Na (+), 3 M ((C1O4(-)+(X (-))/AgX/Ag (X = C1 (-) and Br (-), the halide ion concentrations were determined in solutions containing (CH3)2Sn (+2). The values of the 117 Sn and 119 Sn methyl proton spin-spin coupling constants and the integrated Raman intensities for tin-chloride bond stretching in solutions as a function of chloride ion concentration indicated that both inner- and outer-sphere complexes are formed. Only in concentrated chloride solutions are appreciable concentrations of the inner-sphere complex present. The Raman spectra show that inner-sphere complexing also occurs in concentrated bromide solutions. The dimethyltin (IV) ion is characterized by a high affinity for water molecules, and in many respects the solutions of (CH3)2SnC12 and (CH3)2SnBr2 resemble those of oxonium chloride and bromide. The hypothetical free linear (CH3)2Sn (+2) can be regarded as an extremely 'hard' acid which forms very stable complexes with bases of low polarizability and gives large crystal-field effects in lattices. (Author)

AD-636 378 **Field 7B, 7D**
Newcastle--upon-Tyne Univ. (England). Dept. of Inorganic Chemistry.
RELATIVE ACCEPTOR STRENGTHS OF THE GALLIUM TRIHALIDES TOWARDS PYRIDINE AND TRIETHYLAMINE AS DONORS.
by N. N. Greenwood, and T. S. Srivastava. 1 Sep 65, 7p
Contract AF 61 (052)-910
Proj. AF-9710
Task 971002
AFOSR-66-1032

Descriptors: (*Gallium compounds, *Complex compounds), (*Amines, Complex compounds), (*Pyridines, Complex compounds), Oxidation-reduction reactions, Bromides, Chlorides, Iodines, Melting point, Heat of formation, Heat of reaction, Dissociation, Stereochemistry, Phase studies.

Identifiers: Triethylamine.

The 1:1 adducts of triethylamine with gallium trichloride, tribromide, and tri-iodide were prepared and characterised by melting point-composition diagrams. Two other new compounds C5H5N, GaI3 and 2C5H5N, GaBr3 were also prepared. The heats of formation of the 1:1 pyridine adducts of gallium tribromide and tri-iodide and of the 2:1 adduct with the tribromide were determined calorimetrically and compared with the corresponding data for the pyridine adducts of gallium trichloride. The results were used to estimate the gas-phase heats of formation, the intrinsic heats of addition, and the donor-acceptor bond dissociation energies; each of these quantities follows the order GaC13>GaBr3>GaI3. Comparison with the corresponding pyridine adducts of the boron and aluminium trihalides indicates that the relative acceptor strength towards pyridine follows the order AIX3>BX3>GaX3. The heats of formation of the triethylamine adducts of the gallium trihalides were also measured; there is a dramatic decrease in acceptor strength in the sequence GaC13>>GaBr3>GaI3. This is interpreted in terms of a steric effect. (Author)

N66-16692 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
Sperry Rand Research Center, Sudbury, Mass.
DEVELOPMENT OF CHEMICAL ANALYSIS TECHNIQUES FOR ADVANCED MATERIALS RESEARCH PROGRAM.
Quarterly progress rept. no. 4, 1 Sep-30 Nov 65.
by F. D. Leipziger. 1965, 14p SRRC-RR-65-111
Contract NAS7-100
NASA-CR-70052

Descriptors: *Impurity, *Magnesium oxide, *Mass spectroscopy, *Material testing, *Tantalum carbide, *Chemical analysis, *Emission spectrum.

For abstract, see T 66 18.

AD-636 353 **See Field 7D**

AD-636 429 **See Field 7D**

AD-636 498 **See Field 7D**

AD-636 682 **See Field 7D**

7C. ORGANIC CHEMISTRY

AD-636 343 **Field 7C**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
STUDIES IN PHOSPHINEMETHYLENE CHEMISTRY. XV. THE REACTION OF TETRAARYLPHOSPHONIUM BROMIDES WITH VINYLIC ORGANOLITHIUM REAGENTS.
by Dietmar Seyferth, Joseph Fogel, and James K. Heeren. 20 Dec 65, 6p
AROD-2832:31
Research supported in part by PHS. See also AD-632 427.

Descriptors: (*Organic phosphorus compounds, Synthesis (Chemistry)), (*Phosphines, Chemistry), (*Phosphonium compounds, Chemical reactions), Aromatic compounds, Bromides, Metalorganic compounds, Styrenes, BenzenesLethium compounds.

Identifiers: Methyl styrenes, Organic lithium compounds, Phosphine methylenes, Tetraphenyl phosphonium bromides.

The reaction of vinyllithium with tetraphenylphosphonium bromide was found to give styrene (65%) and triphenylphosphine (80%). Further studies suggested that these are formed via intermediate vinyltetraphenylphosphorane. When isopropenyllithium was used, alpha-methylstyrene was produced in 70% yield, but analogous reactions of cis- and trans-1-propenyllithium gave only low yields of cis- and trans-propenylbenzene, respectively. The reaction of vinyllithium with tetra-p-tolylphosphonium bromide resulted in formation of p-methylstyrene (61%). (Author)

AD-636 356 **Field 7C**
Fordham Univ., Bronx, N. Y. Dept. of Chemistry.
SYNTHESIS OF CIS- AND TRANS-7-AZABICYCLO (4.2.0)OCTANES.
by Emil J. Moriconi, and Paul H. Mazzocchi. 18 Nov 65, 11p
Grant AF-AFOSR-488-64
Proj. AF-9762
Task 976202
AFOSR-66-1356

Descriptors: (*N-heterocyclic compounds, Synthesis (Chemistry)), Polycyclic compounds, Alcohols, Chemical reactions, Molecular isomerism, Organic sulfur compounds.

Identifiers: Aza bicyclooctanes.

Base treatment of N,O-ditosyl-trans-2-aminomethyl cyclohexanol and N,O-ditosyl-cis-2-aminocyclohexane methanol led to the identical fused-ring azacyclobutane derivative, 7-tosyl-cis-7-azabicyclo (4.2.0) octane (I). Similar treatment of N,O-ditosyl-trans-2-aminocyclohexane methanol converted it to 7-tosyl-trans-7-azabicyclo (4.2.0) octane (II). Reductive detosylation of I and II with sodium in isoamyl alcohol led, respectively, to the previously unreported parent heterocycles, cis- (III) and trans-7-azabicyclo (4.2.0) octane (IV). The adduct, 7-chlorosulfonyl-8-ketobenzo (d) -cis-7-azabicyclo (4.2.0) octane, prepared by chlorosulfonyl isocyanate addition to 1,2-dihydronaphthalene, was reduced with lithium aluminum hydride to benzo (d) -cis-7-azabicyclo (4.2.0) octane (IV). Unstable III, IV and V were converted to their equally unstable N-methyl derivatives via the Eschweiler-Clarke procedure. (Author)

AD-636 366 **Field 7C**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
CC12 INSERTION INTO TETRAALKYL-SILICON AND -TIN COMPOUNDS VIA PHENYL (BROMODICHLOROMETHYL) MERCURY.
by Dietmar Seyferth, and Stephen S. Washburne.
12 Jan 66, 5p
Grant AF-AFOSR-502-66
Proj. AF-9762
Task 976201
AFOSR-66-1028

Descriptors: (*Silanes, Chemical reactions), (*Tin compounds, *Metalorganic compounds), (*Mercury compounds, Metalorganic compounds), Chlorine compounds, Halogenated hydrocarbons, Bromine compounds, Chemical bonds, Cyclohexanes.

Identifiers: Dichloro methylenes, Organotin compounds, Phenyl (Bromo dichloromethyl) mercury, Si-heterocyclic compounds, Sn-heterocyclic compounds.

The reaction of phenyl (bromodichloromethyl) mercury with n-propyl trimethyl tin, n-propyl trimethyl silane, 1,1,3-trimethyl-1-stannacyclohexane, and 1,1,3-trimethyl-1-sila-cyclohexane inserts dichloromethylene (CC12) very specifically into a beta C-H bond of the silicon and tin alkyls. Possible mechanisms are discussed.

AD-636 556 **Field 7C**
Washington State Univ., Pullman. Dept. of Chemistry.
2-AMINOBENZO (b)THIOPHENE. AN AROMATIC RING TAUTOMER.
by Gardner W. Stacy, F. Warren Villaescusa, and Thomas E. Wolliner. 18 May 65, 5p
Contract DA-49-193-MD-2049

Descriptors: (*Thiophenes, Synthesis (Chemistry)), (*Molecular isomerism, Thiophenes), Amines, Aromatic compounds, S-heterocyclic compounds, Molecular structure, Chemical properties.

Identifiers: Amino benzothiophenes.

Synthesis of 2-aminobenzo (b)thiophene (I), a representative of an elusive group of thiophene derivatives, was achieved in a five-step sequence from thiosalicylic acid in a 48% over-all yield. Prior to this, primary aminothiophenes and aminobenzothiophenes have frequently been regarded inisolable as pure, free bases. The key step of the synthesis is the aluminum bromide cleavage of the benzyl sulfide to give 80% of I; this littleknown procedure appears to have superior potential in the synthesis of sulfur heterocycles. The structure of I is clearly established by spectroscopic evidence, including an examination of the partially deuterated derivative. Chemically, I has the expected properties of a heterocyclic amine. It may be diazotized and subsequently converted to the 2-bromo or 2-ketodihydro derivatives, respectively. Unlike naphtho (1,2-c) thiophene-1 (3H)-imine, I resists ring opening and subsequent oxidation to a disulfide.

AD-636 557 **Field 7C, 6O**
Washington State Univ., Pullman. Dept. of Chemistry.
A NEW SYNTHETIC ROUTE TO SUBSTITUTED MERCAPTOETHYLAMINES. HYDROXYL DISPLACEMENT BY THIOLS.
by Gardner W. Stacy, Buford F. Barnett, and Philip L. Strong. 8 Aug 63, 7p
Contract DA-49-193-MD-2049

Descriptors: (*Thiols, Synthesis (Chemistry)), (*Radioprotective agents, Thiols), Catalysis, Alcohols, Displacement reactions, Sulfides, Oximes, Amines.

Identifiers: Amino ethyl cyclohexanethiols, Amino methyl butanethiols, Amino methyl pentanethiols, Mercapto ethylamines, Mercapto ethyl aminopentanes.

A catalytic displacement reaction of the hydroxyl group of ethynyl carbinols (I) by thiols was discovered. The displacement is accompanied by internal hydration of the acetylenic function of I. These developments made possible a new synthetic approach to substituted mercaptoethylamines. A beta-keto sulfide is converted to an oxime II. The protecting benzyl group of II is then removed by reaction with sodium in liquid ammonia to give an alpha-thiol oxime. This intermediate is reduced with lithium aluminum hydride to yield a substituted mercaptoethylamine, wherein the thiol group is located on a tertiary carbon atom and the amino group, on a secondary carbon atom. (Author)

AD-636 558 **Field 7C**
Washington State Univ., Pullman. Dept. of Chemistry.
A TAUTOMETRIC NITRILE-THIOL IMINO-THIOLACTONE SYSTEM.
by Gardner W. Stacy, Anthony J. Papa, F. Warren Villaescusa, and Suvas C. Ray. 8 Aug 63, 7p
Contract DA-49-193-MD-2049

Descriptors: (*Nitriles, Molecular isomerism), (*Thiols, Molecular isomerism), (*Lactones, *Molecular isomerism), Imines, S-heterocyclic compounds, Thiophenes, Molecular structure, Spectra (Infrared), Nuclear magnetic resonance.

An interesting type of ring-chain tautomerism was studied. When naptho (1,2-c)thiophen-1 (3H)imine (Z-mercaptomethyl-1-naphthonitrile) (I) was reduced with sodium borohydride-aluminum chloride (3:1), its tautomeric character became apparent in that products corresponding to both the chain form, (1-aminomethyl-2-naphthyl)methanethiol (II, 17%), and ring form, 1,3-dihydronaphtho- (1,2-c)thiophene (III, 48%), resulted. It was found that when the proportion of sodium borohydride-aluminum chloride was increased from 3:1 to 4:1, II was obtained as the sole product (51%). The structure of I in the solid state and in chloroform solution appears to be that of naphtho (1,2-c)thiophen-1 (3H)-imine as confirmed by infrared and n.m.r. spectra. The chemical properties of I under neutral and acidic reaction conditions also substantiate this structure. In agreement with the conditions of reduction, in basic media it is possible to demonstrate the chain tautomeric structure by sulfide and disulfide formation. (Author)

AD-636 566 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Redstone Scientific Information Center, Redstone Arsenal, Ala.
INTRODUCTION OF AROMATIC AND HETEROCYCLIC RADICALS IN FERROCENE. REACTION OF BROMO FERROCENE WITH ORGANIC MAGNESIUM COMPOUNDS.
by A. N. Nesmeianov, V. A. Sazonova, and V. N. Drozd. 27 Jun 66, 10p RSIC-573
TT-66-61900
Trans. of Akademiya Nauk SSSR. Doklady, v165 n3 p575ff 1965.

Descriptors: (*Ferrocenes, *Grignard reactions), (*Aromatic compounds, Ferrocenes), (*N-heterocyclic compounds, Ferrocenes), Metalorganic compounds, Magnesium compounds, Bromides, Bromine compounds, Copper compounds, Copper, Pyrroles, Indoles, Synthesis (Chemistry), Cyclohexenes, Nuclear magnetic resonance, USSR.

Identifiers: Bromo ferrocenes, Indoyl ferrocenes, Naphthyl ferrocenes, Phenyl ferrocenes, Pyrrole ferrocenes, Thienyl ferrocenes.

When an ether solution of Grignard reagent was added to a mixture of bromo ferrocene, cuprous bromide, and copper, the ether distilled, and the reaction mixture heated under nitrogen at 130 C, phenyl-alpha-thienyl- and alpha-naphthyl-ferrocenes were obtained with a yield of 75%-80%. The reaction proceeded differently in the case of the allylic Grignard reagent, chlorous cyclohexylmagnesium: the reaction basically became a conversion of bromo ferrocene to ferrocene, and cyclohexene was also extracted from the reaction mixture. A mixture of alpha- and beta-pyrrole-ferrocenes was created during the intenraction of bromo ferrocene with bromine pyrrole magnesium in the presence of Cu2Br2 + Cu. Idolyl bromide behaved somewhat differently in this reaction: N and beta-indolyl-ferrocenes were produced. The structures of the compounds obtained were determined on the basis of N.M.R. Spectra.

AD-636 783 **Field 7C, 7I**
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
THE AUTOXIDATION OF HYDROCARBONS.
by K. U. Ingold. Mar 66, 3p NRC-8886

Descriptors: (*Hydrocarbons, *Oxidation), (*Free radicals, Oxidation), Peroxides, Ethers, Chemical reactions, Reaction kinetics, Canada.

Identifiers: Auto-oxidation.

Work in the Hydrocarbon Section of the Division of Applied Chemistry, N.R.C., is concerned with the products, mechanisms and kinetics of the reactions of free-radicals in solution. At the present time work is concentrated mainly on autoxidation so that most studies involve peroxy and alkoxy radicals. The paper outlines the mechanism of hydrocarbon autoxidation. The importance of an adequate knowledge of the rates of the individual elementary reactions in predicting the behavior of hydrocarbon mixtures is emphasized. The paper also discusses some methods for retarding oxidation. (Author)

AD-636 843 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
State Univ. of New York, Buffalo.
FACTORS AFFECTING THE ELECTROPHILICITY AND NUCLEOPHILICITY OF REAGENTS.
Final rept., 1 Sep 62-20 May 66.
by Calvin D. Ritchie. 20 May 66, 21p
Grant DA-ARO (D)-31-G376
Proj. ARO (D)-009925001
AROD-3823.1

Descriptors: (*Dyes, Chemical reactions), Amines, Reaction kinetics, Solvents, Water, Solutions, Heavy water, Chemical indicators.

Identifiers: Malachite green.

The apparent simplicity of the reactions of Malachite Green cation (bis- (p-dimethylaminophenyl) phenylmethyl cation) with nucleophilic reagents strongly recommends these reactions for use in the study of solvent effects on the reactivity of nucleophiles. The report summarizes a research program initiated to study the rates of the reaction of a series of Malachite Green cations with a number of nucleophilies in several dipolar aprotic solvents, and the same reactions in water for comparison. (Author)

AD-637 079 **Field 7C, 7I**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
VOLATILE RARE EARTH CHELATES.
by Kent J. Eisentraut, and Robert E. Sievers. 13 Sep 65, 7p ARL-65-268
Proj. AF-7023
Task 702308

Descriptors: (*Chelate compounds, *Rare earth compounds), Synthesis (Chemistry), Vapors, Complex compounds, Gas chromatography, Ketones, Fluorine compounds.

Volatile chelates of 15 trivalent rare earths were synthesized and characterized mixtures of the complexes separated by gas chromatography. One of the objectives of this study was to separate rare earth complexes by gas chromatography. All previous efforts have failed owing to the lack of volatility and the thermal instability of the other rare

earth chelates examined. Work now in progress is directed to the synthesis of derivatives of H (thd), particularly of the type in which fluorocarbon moieties are incorporated in hopes of obtaining complexes that are even more volatile. Spectral, magnetic susceptibility, and single crystal X-ray data are also being studied to further characterize these unusually volatile complexes. (Author)

AD-637 082 **Field 7C, 6C**
Hebrew Univ., Jerusalem (Israel). Dept. of Botany.
THE REACTION OF EDTA WITH CHROMOTROPHIC ACID.
by Y. Shain, and A. M. Mayer. 4 Feb 63, 4p
Contract AF 61 (052)-546

Descriptors: (*Algae, *Culture media), (*Ethylenedinitrilo tetraacetates, Chemical reactions), Sulfonic acids, Complex compounds, Absorption spectrum, Colorimetric analysis, Heating, Copper, Iron, Calcium, Naphthalenes, Israel.

Identifiers: Chromotrophic acid.

During attempts to estimate the glycollic acid content of culture solutions in which green algae were cultured, using chromotrophic acid, 1,8-dihydroxy-naphtalene-3, 6-disulphonic acid, marked interference by ethylenediamine tetraacetic acid was noted. Since there was some indication that the reaction was stoichometric, it was investigated in greater detail. EDTA was found to give a violet coloured compound with chromotrpohic acid with a maximum absorption at 570 millimicrons. The reaction of chromotrophic acid with EDTA is presumably based on the formation of formaldehyde from the acetic acid residues of the molecule, so that in principle the reaction is similar to that of chromotrophic acid with a large number of other compounds.

N66-17664 **Field 7C**
CFSTI Prices: HC$3.00 MF$0.50
Monsanto Research Corp., Everett, Mass. Boston Lab.
RESEARCH AND DEVLOPMENT OF THE DRY TAPE BATTERY CONCEPT.
Quarterly rept no. 2, 9 Sep-8 Dec 65.
by L. F. Athearn, J. J. Byrne, B. A. Gruber, J. C. Mac Donald, and D. L. Williams. 18 Jan 66, 59p
Contract NAS3-7624
NASA-CR-54902

Descriptors: *Aluminum chloride, *Triazine, *Battery, *Chlorine compound, *Magnesium compound, *Nitrogen compound.

For abstract, see T 66 18.

AD-636 331 **See Field 6H**

AD-636 368 **See Field 7D**

AD-636 623 **See Field 11E**

AD-636 653 **See Field 7D**

AD-636 701 **See Field 11I**

AD-636 770 **See Field 7D**

7D. PHYSICAL CHEMISTRY

AD-467 100 **Field 7D, 10C**
CFSTI Prices: HC$12.60 MF$0.75
California Univ., Riverside. Dept. of Chemistry.
ELECTROCHEMISTRY OF DISSOLVED GASES.
Final rept., 1 Mar 61-31 Mar 64.
by Donald T. Sawyer. 1 Jan 65, 122p
Contract AF 19 (604)-8347
Reprints from various journals.

Descriptors: (*Gases, Electrochemistry), (*Electrochemistry, Gases), Solutions, Electrolytes, Electrodes, Surface properties, Oxygen, Hydrogen, Sulfur compounds, Dioxides, Cyanides, Hydrogen compounds, Carbon compounds, Monoxides, Materials, Measurement, Voltage.

The electrochemistry of various dissolved gases has been investigated as a function of the gas, solution pH, supporting electrolyte, electrode material, and the preconditioning of the electrode surfaces. These investigations have been conducted through the use of voltammetry, chronopotentiometry, and galvanostatic measurements. The gases inveestigated include oxygen, hydrogen, sulfur dioxide, hydrogen cyanide, carbon monoxide, and carbon dioxide. Electrodes have been constructed from a number of materials including platinum, gold, silver, nickel, palladium, iridium, rhodium, and mercury. As a result of the investigations kinetic parameters for several electrochemical reactions of dissolved gases have been measured. Also for several of the investigations mechanisms that are consistent with the experimental data have been postulated for the electrode processes involving dissolved gases. A number of analytical procedures for various dissolved gases have resulted from the work under the subject contract and the understanding of the effect of electrode material on the rate of several gases has been improved. (Author)

AD-636 350 **Field 7D**
Brandies Univ., Waltham, Mass. Dept. of Physics.
MEASUREMENT OF THE DENSITY OF SATURATED CESIUM VAPOR BY AN OPTICAL METHOD.
Interim rept.
by M. Rozwadowski, and E. Lipworth. 3 Jun 65, 8p Scientific-1
Contract AF 19 (628)-2458
Projs. AF-4600, AF-4645
Tasks 460006, 464502
AFCRL-66-198

Descriptors: (*Cesium, Density), Vapor pressure, Optical analysis, Measurement, Pumping (Optical), Rubidium, Interferometers, Atomic energy levels, Hyperfine structure.

The vapor pressure of cesium metal was measured as a function of temperature using a scanning Fabry-Perot Interferometer. The apparatus was constructed to measure cesium vapor densities in optical pumping experiments. In clean evacuated glass bulbs the vapor pressure of pure cesium metal is in close agreement with the results of Langmuir and Taylor. The vapor pressure is lowered considerably if rubidium metal is mixed with the cesium. (Author)

AD-636 353 **Field 7D, 7B**
Maryland Univ., College Park. Dept. of Chemistry.
183W - 31P SPIN-SPIN COUPLING IN OCTAHEDRAL COMPLEXES.
by S. O. Grim, W. McFarlane, and D. A. Wheatland. 1966, 5p
Grant AF-AFOSR-782-65
Proj. AF-9710
Task 971001
AFOSR-66-1029

Descriptors: (*Complex compounds, *Nuclear magnetic resonance), (*Phosphorus compounds, Molecular association), (*Tungsten compounds, Molecular association), Metal carbonyls, Nuclear spins, Phosphines, Chemical bonds.

Identifiers: Spin-spin coupling, Tributylphosphine tungsten tetracarbonyls, Triphenylphosphine tungsten pentacarbonyls.

The phosphorus-31 nuclear magnetic resonance spectrum of trans-bis (tributylphosphine) tungsten tetracarbonyl, a new compound, and triphenylphosphine tungsten pentacarbonyl are reported. Each of the spectra consists of a main peak with small satellites due to tungsten-183-phosphorus-31 coupling with JW-P = 265 plus or minus 15 cps and 280 plus or minus 25 cps respectively. (Author)

AD-636 354 **Field 7D, 20M**
Oklahoma Univ., Norman.
METHOD FOR DETERMINATION OF DENSITY OF CRYOGENIC LIQUIDS AND MIXTURES.
by M. Y. Shana'a, and F. B. Canfield. 1966, 6p
Grant AF-AFOSR-1020-66
Proj. AF-9760
Task 976003
AFOSR-66-1374

Descriptors: (*Cryogenics, Density), (*Liquids, Cryogenics), Test methods, Mixtures, Measurement, Densimeters.

A low-temperature experimental apparatus was developed for the determination of the density of cryogenic liquids and mixtures. After a study of different techniques it was concluded that the pycnometer method would give the most accurate results. The density can be determined under atmospheric and sub-atmospheric pressure and in a temperature range of 77 to 273K. The density of a cryogenic liquid (pure or mixture) was determined by condensing the component gases from a high-pressure weighing bomb into a 30 cucm low-Temperature quartz pycnometer. The pycnometer was placed in a double dewar cryostat controller to plus or minus 0.002C. Shematic diagrams of the weighing bomb and pycnometer are given. A detailed error analysis shows that this apparatus is capable of density measurements to within an absolute accuracy of plus or minus 8X0.00001 g/cucm for methane. For an equimolal mixture of methane-propane, the calculated error is about doubled. (Author)

AD-636 355 **Field 7D**
National Academy of Sciences-National Research Council, Washington, D. C. Div. of Chemistry and Chemical Technology.
CHEMISTRY AT HIGH TEMPERATURES.
by Martin A. Paul, and John L. Margrave. 1966, 4p
Grant AF-AFOSR-1040-66
Proj. AF-9760
Task 976002
AFOSR-66-1354

Descriptors: (*High-temperature research, Chemistry), (*Thermochemistry, Symposia), Synthesis (Chemistry), Chemical bonds, Molecular association, Thermodynamics, Molecular properties, Transport properties, Reviews.

A summary is given of highlights of a conference of the present and future problems in chemistry at high temperatures, held at Rice University, Texas, 26-27 January 1966.

AD-636 368 **Field 7D, 7C**
Minnesota Univ., Minneapolis. School of Chemistry.
CONDUCTOMETRIC, POTENTIOMETRIC, AND SPECTROPHOTOMETRIC DETERMINATION OF DISSOCIATION CONSTANTS OF SUBSTITUTED BENZOIC ACIDS IN ACETRONITRILE.
by I. M. Kolthoff, and M. K. Chantooni Jr. 4 Oct 65, 13p
Grant AF-AFOSR-28-65
Proj. AF-9710
Task 971003
AFOSR-66-1031

Descriptors: (*Benzoic acids, Dissociation), (*Dissociation, Reaction kinetics), Chemical equilibrium, Electrochemistry, Spectroscopy, Acetonitriles, Salicylic acids, Organic nitrogen compounds, Volumetric analysis, Alcohols.

Identifiers: Conductometric analysis, Dinitrobenzoic acids, Hydroxybenzoic acids, Nitrobenzoic acids, Potentiometric titration.

The two methods developed for the determination of the dissociation constant, K (d)HA, of uncharged weak acids in acetonitrile (AN) and also the methods for the determination of the homoconjugation constant, K (f)HA2-, give reliable results only when certain conditions are fulfilled. In order to check the reliability of the methods the overall dissociation constants, K (d)2HA, of 3,5-dinitrobenzoic acid (HDNB), salicylic, p-nitrobenzoic, m-nitrobenzoic, p-hydroxybenzoic, and benzoic acids were calculated from the characteristics of the conductometric titration curves with weak bases and the constants K (d)HA and K (f)HA2- from potentiometric measurements with the glass electrode. K (d)2HA of HDNB and salicylic acids were also calculated from spectrophotometric data with p,p'-dimethylaminoazobenzene as indicator. Under the specified conditions there is a gratifying agreement among the results of the three methods which are reported. The homoconjugation constant of the salicylate ion was found to be unexpectedly large. (Author)

AD-636 384 **Field 7D, 10B**
CFSTI Prices: HC$5.00 MF$1.00
Ottawa Univ. (Ontario).
ELECTROCHEMICAL STUDIES OF PLATINUM SURFACE OXIDATION IN RELATION TO HYDROCARBON OXIDATION. PARTS I, II, AND III.
Interim rept., Jun 64-Mar 66.
by D. Gilroy, L. Marincic, J. Wojtowicz, E. J. Rudd, and B. E. Conway. Mar 66, 170p
Prepared in cooperation with Canadian Commercial Corp., Washington, D. C.

Descriptors: (*Hydrocarbons, Oxidation), (*Platinum, Oxidation), (*Oxidation, *Electrochemistry), Fuel cells, Electrodes, Oxygen compounds, Adsorption, Labeled substances, Surfaces, Oxides, High-temperature research.

The contents of the report cover several complementary aspects of work on oxidation mechanisms at the platinum anode with particular reference to oxidation of, or electrochemical adsorption of oxygen - containing species at, platinum and the behaviour of hydrocarbons at the oxidised platinum anode surface. A number of complementary procedures were used in the studies including steady-state measurements, direct and differential galvanostatic studies and potentiodynamic experiments as well as some examination of carbon-14 labelled molecules at the platinized platinum electrode.

AD-636 427 **Field 7D, 14E**
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
VAPOR DEPOSITED SILVER BROMIDE AS AN ION DETECTOR FOR MASS SPECTROGRAPHY.
Instrumentation papers.
by Maynard H. Hunt. 23 Feb 66, 7p AFCRL-IP-103, AFCRL-66-459
Proj. AF-5620
Task 56003

Descriptors: (*Mass spectroscopy, *Photographic plates), Ions, Detection, Silver compounds, Bromides, Glass, Vapor plating, Photosensitivity, Photographic contrast, Photographic fog.

Identifiers: Silver bromide.

Vapor deposited films of silver bromide on glass plates were investigated as detectors for 20 KeV ions in mass spectrography. The sensitivity of the plates is slightly less than that of the Ilford Q-2, the contrast is greater, and the background fog is negligible. (Author)

AD-636 429 **Field 7D, 7B**
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
ELECTRONIC STRUCTURE OF C2.
Physical sciences research papers.
by P. F. Fougere, and R. K. Nesbet. 10 Sep 65, 17p AFCRL-PSRP-246, AFCRL-66-456
Proj. AF-7601
Task 760105
Prepared in cooperation with IBM Research Labs., San Jose, Calif. Doctoral thesis.

Descriptors: (*Diatomic molecules, Carbon), (*Carbon, *Molecular orbitals), Electrons, Spectroscopy, Ground state, Valence, Wave functions, Dissociation, Molecular energy levels.

The electronic structure of the diatomic carbon (C2) molecule was studied over the range R=1.5a0 to 8.0a0 using three different slater-type-orbital basis sets and two different levels of configuration. Analytic potential curves and computed spectroscopic constants are given for all states studied. The behavior of all eigenvalues of each CI matrix was studied extensively with excellent agreement between molecular results and those obtained by independent calculations on a pair of separated carbon atoms. The wigner-Witmer rules were obeyed in every case. Observed and computed spectroscopic constants were highly correlated statistically; linear relationships were determined which allow semiempirical prediction of spectroscopic constants for those states not yet observed. Using the predictions for Te, an electronic spectrum was derived. (Author)

AD-636 450 **Field 7D, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
LOW FREQUENCY MOLECULAR MOTIONS IN WATER AND ICE AND THE EFFECTS OF IONS AND ORGANIC SOLVENTS ON THE STRUCTURE OF WATER.
Technical rept.
by H. J. Prask, and H. P. Boutin. Jul 66, 29p
Proj. DA-1C014501A32B01
PA-TR-3348

Descriptors: (*Water, *Neutron spectrum), (*Ice, Neutron spectrum), Electrolytes, Ions, Organic solvents, Molecular association, Potassium compounds, Thiocyanates, Calcium compounds, Chlorides, Acetones, Sulfoxides.

Identifiers: Calcium chloride, Dimethyl sulfoxide, Potassium thiocyanate.

The inelastic scattering of low energy (.005 eV) neutrons was used to investigate the structure of water and the effects of various ions and organic solvents on the structure of water. The gross features of the neutron spectra of ice and water are known. However, with improved resolution, additional peaks were observed in ice (250K) at 50, 62, 76, 103, and 150/cm. Similar peaks are observed in water at 293K but become less pronounced at higher temperatures. The intense peak attributed to hindered rotations centered at 585/cm in ice (250K) can be decomposed into peaks at 550, 650, and 800/cm, assuming Gaussian shapes with the width determined by instrumental resolution and the intensity by level population. No similar decomposition can be made for the broader torsional peak in water. The neutron spectra of 2M and 5M KSCN, and 2M CaC12 solutions display an increased broadening in the torsional region of the spectra and a decrease in structure below 100/cm. This is attributed to a reorganization of the clusters around the ions in the liquid and changes in overall cluster size and inter-atomic distances. The neutron spectra of deuterated organic solvents (3.7M acetone, 3.9M dimethyl sulfoxide) in water were also obtained. (Author)

AD-636 455 **Field 7D**
Chicago Univ., Ill. Dept. of Physics.
EXTENDED HARTREE-FOCK WAVEFUNCTIONS: OPTIMIZED VALENCE CONFIGURATIONS FOR H2 AND L2, OPTIMIZED DOUBLE CONFIGURATIONS FOR F2.
by G. Das, and Arnold C. Wahl. 20 Aug 65, 10p
Contract DA-11-022-ORD-3119, Grant NSF-3427
AROD-3835:14
Prepared in cooperation with Argonne National Lab., Ill. Chemistry Div.

Descriptors: (*Hartree-Fock approximation, Diatomic molecules), (*Wave functions, *Molecular orbitals), (*Hydrogen, Wave functions), (*Lithium, Wave functions), (*Fluorine, Wave functions), Molecular energy levels, Valence, Dissociation, Chemical bonds, Ground state, Programming (Computers).

As a step beyond the Hartree-Fock technique in the search for better energies, wavefunctions, and the general description of molecular formation and dissociation, a configuration-mixing method of the following nature is developed and illustrated for H2, Li2, and F2. The wavefunction consists of several optimized configurations obtained by replacing one of the sigma-orbitals of the primary configuration (in this case the Hartree-Fock) by orbitals of different kinds. All the orbitals involved are orthonormalized, insuring orthonormalization of the configurations themselves. The method determines energetically the optimum combination of both the mixing coefficients and the linear orbital parameters by the solution of SCF-type equations and insures dissociation of the molecule to two Hartree-Fock atoms. A program based upon this formalism was constructed for the IBM 7094 computer and is capable of handling homonuclear diatomic molecules using as many as ten configurations with up to 33 two-center symmetry basis functions. Results obtained are energetically better than conventional multiconfiguration studies and since our method is designed to account for added correlation energy associated with molecular formation, calculated potential curves much more realistic than the Hartree-Fock ones can be realized. Sample calculations which represent a partial-optimization procedure within the framework of the analysis are given for the molecules H2, Li2, and F2. It is felt, however, that these results are quite close to the true solution. The binding energies obtained with these optimized configuration functions are 4.63, 0.93, and 0.54 eV for H2, Li2, and F2, respectively, as contrasted with the Hartree-Fock dissociation energies of 3.64, 0.17, and -- 1.37 eV. (Author)

AD-636 456 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
ANALYTIC SELF-CONSISTENT FIELD WAVEFUNCTIONS AND COMPUTED PROPERTIES FOR HOMONUCLEAR DIATOMIC MOLECULES.
by Arnold C. Wahl. 28 Apr 64, 12p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-3835:13
Prepared in cooperation with Argonne National Lab., Ill.

Descriptors: (*Hartree-Fock approximation, Diatomic molecules), (*Wave functions, *Molecular orbitals), (*Fluorine, Wave functions), Molecular energy levels, Numerical analysis, Programming (Computers), Matrix algebra, Integrals, Molecular properties, Probability.

The analytic and computational framework for Hartree-Fock-Roothaan calculations on homonuclear diatomic molecules is presented. Several approaches to calculating the wavefunction are sketched as well as methods of computing molecular properties from the wavefunction. Emphasis is given to the efficient organization of these calculations for existing digital computers. Typical results obtained through the application of the programs and techniques developed are presented for the fluorine molecule. (Author)

AD-636 457 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.

ELECTRIC-DIPOLE POLARIZABILITY OF ATOMS BY THE HARTREE-FOCK METHOD. II. THE ISOELECTRONIC TWO- AND FOUR-ELECTRON SERIES.
Doctoral thesis.
by Howard D. Cohen. 17 May 65, 5p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-008:19
See also AD-636 466.

Descriptors: (*Dipole moments, Polarization), (*Atomic orbitals, *Hartree-Fock approximation), (*Helium, Dipole moments), (*Beryllium, Dipole moments), Electric fields, Wave functions, Electric moments, Perturbation theory.

Results are presented for the electronic-dipole polarizabilities of the isoelectronic series of helium and beryllium in the presence of a finite electric field. These calculations were done analytically, but large numbers of carefully chosen and optimized basis functions were used in order to assure a good fit to the exact solution for the perturbed Hartree-Fock wavefunction. It was found that the polarizabilities of the helium series increase, and those of the beryllium series decrease, as the field increases. (Author)

AD-636 458 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
OCTOPOLE MOMENT OF METHANE.
by John J. Sinai. 24 Feb 64, 3p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-008:18

Descriptors: (*Wave functions, Methane), (*Methane, *Electric moments), Molecular orbitals, Molecular energy levels, Integrals.

Identifiers: Octopole moments.

The octopole moment of methane is calculated using three different LCAO-MO-SCF wavefunctions. The numerical method of calculation is illustrated. Results are compared with the experimental value of James and Keenan, as well as the theoretically computed value of Turner et al. who used the one-center-expansion-method wavefunction of Saturno and Parr. A brief discussion of these different wavefunctions and the octopole moments obtained from them is given. (Author)

AD-636 459 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
SELF-CONSISTENT-FIELD WAVEFUNCTIONS AND COMPUTED POTENTIAL-ENERGY CURVES FOR THE NH3 AND NH MOLECULES, IN ONE-CENTER APPROXIMATION.
by Bhairav D. Joshi. 13 Apr 65, 19p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-3835:10

Descriptors: (*Molecular orbitals, *Wave functions), (*Ammonia, Wave functions), (*Nitrogen compounds, Wave functions), (*Potential energy, Molecular orbitals), Chemical bonds, Dipole moments, Ionization potentials, Molecular energy levels, Hartree-Fock approximation, Integrals.

Identifiers: Imidogen.

Single-determinant self-consistent field wavefunctions calculated by the one-center expansion method are reported for the NH3 and NH molecules. The molecular orbitals were expanded in terms of symmetry adapted Slater-type orbitals centered at the heavy nucleus. To obtain the potential-energy curve for the NH3 molecule corresponding to the tunneling motion of the N atom through the H3 plane, the calculations were carried out for twelve different geometrical configurations. Only those geometrical configurations of NH3 are considered for which all three N-H distances are the same, and are denoted by R-NH (NH3). For each geometrical configuration of NH3, defined by a fixed value of the bond angle (or the apex angle), the optimum values of R-NH (NH3) and basis function exponents were determined. For the NH molecule, the calculations were carried out at seven different internuclear distances, R-NH. At each R-NH, the best basis function exponents were determined. These seven points were used to construct the potential-energy curve of NH. For NH3 in the equilibrium configuration, the calculated values for the bond length, bond angle, total energy, dipole moment, and the first ionization potential, are 1.867 bohr, 109.342 degrees,-56.084186 hartree, 0.5993 a.u. (1.5231 D) and 0.4155 hartree, respectively. For planar NH3, the calculated bond length, total energy, and the first ionization potential are 1.853 bohr,-56.043064 and 0.3836 hartree, respectively. (Author)

AD-636 460 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
STUDIES IN MOLECULAR STRUCTURE. V. COMPUTED SPECTROSCOPIC CONSTANTS FOR SELECTED DIATOMIC MOLECULES OF THE FIRST ROW.
by S. Fraga, and Bernard J. Ransil. 15 Aug 60, 12p
Contract DA-11-022-ORD-3119
AROD-008:6
See also AD-636 461. Research supported in part by NSF.

Descriptors: (*Molecular structure, Quantum mechanics), (*Diatomic molecules, Spectroscopy), (*Molecular orbitals, Diatomic molecules), Chemical bonds, Special functions (Mathematical), Field theory, Ground state, Excitation, Ions, Wave functions, Beryllium, Fluorine, Hydrogen, Helium, Lithium, Hydrogen compounds, Fluorides, Lithium compounds, Hydrides, Nitrogen.

Identifiers: Hydrogen fluoride, Lithium hydride.

Limited LCAO MO functions were computed for several diatomic molecules at four different values of the internuclear distance near Re, and the corresponding total energies fitted to a third degree polynomial in R. Spectroscopic constants omega-e, omega-e (chi-e), B-e, alpha-e, R-e, k-e were derived from the resulting potential curve and compared to observed values. The good agreement obtained in most cases suggests a valuable application of the self-consistent field function. In addition calculations were made for a few more values of the internuclear distance providing a potential curve over a reasonably broad range around R-e. (Author)

AD-636 461 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
STUDIES IN MOLECULAR STRUCTURE. IV. POTENTIAL CURVE FOR THE INTERACTION OF TWO HELIUM ATOMS IN SINGLE-CONFIGURATION LCAO MO SCF APPROXIMATION.
by Bernard J. Ransil. 17 Oct 60, 12p
Contract DA-11-022-ORD-3119
AROD-008:4
See also AD-636 462. Research supported in part by NSF.

Descriptors: (*Molecular structure, quantum mechanics), (*Potential energy, *Helium), (*Molecular orbitals, Helium), Ground state, Chemical bonds, Molecular association, Atomic orbitals, Special functions (Mathematical), Wave functions.

Single-configuration LCAO MO SCF wave functions and corresponding total energies were calculated for two ground-state He atoms interacting over an extensive range (0.4 to 12.0 A). Comparison with available experimental data is made; remarkably good agreement is obtained for distances greater than 1.5 A. For the first time, it is believed, an a priori account is given of both the van der Waals minimum and the repulsion region with a wave function of sufficient flexibility to deal with both. The details of repulsion and of bonding in the van der Waals region are analyzed in terms of atomic and overlap populations. (Author)

AD-636 462 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
STUDIES IN MOLECULAR STRUCTURE. III. POPULATIONS ANALYSES FOR SELECTED FIRST-ROW DIATOMIC MOLECULES.
by Serafin Fraga, and Bernard J. Ransil. 15 Aug 60, 18p
Contract DA-11-022-ORD-3119
AROD-008:5

Descriptors: (*Molecular structure, Quantum mechanics), (*Diatomic molecules, *Molecular orbitals), Probability, Hartree-Fock approximation, Integrals, Chemical bonds, Lithium, Beryllium, Carbon, Nitrogen, Fluorine, Carbon monoxide, Lithium compounds, Boron compounds, Fluorides, Hydrides, Hydrogen compounds, Nitrogen compounds.

Identifiers: Boron hydrides, Boron fluorides, Hydrogen fluoride, Imidogen, Lithium hydride, Lithium fluoride.

Electronic population analyses for selected diatomic molecules of the first row of the periodic table are tabulated. The tentative value of population analyses in relation to accuracy of approximation is discussed briefly. (Author)

AD-636 463 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
SELF-CONSISTENT-FIELD WAVEFUNCTIONS FOR THE N3 (-) AND NO2 (;) MOLECULES.
by Enrico Clementi, and A. D. McLean. 7 Mar 63, 3p
Contract DA-11-022-ORD-3119
AROD-008:17

Descriptors: (*Nitrogen, *Wave functions), (*Nitrogen compounds, Molecular orbitals), Chemical bonds, Polarization, Molecular energy levels, Oxides.

Identifiers: Nitrogen oxides.

The self-consistent field (SCF) wavefunctions for the N3 (-) and NO2 (+) molecules are reported. The basis set of Slater-type orbitals (STO's) includes 3d-pi and 3d-sigma STO's, to account for polarization in the bonds. A gain over a previous computation of about 5 eV was obtained in the total energy despite the limited number of functions in the basis set. (Author)

AD-636 464 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
CRITERIA FOR THE CONSTRUCTION OF GOOD SELF-CONSISTENT-FIELD MOLECULAR ORBITAL WAVE FUNCTIONS, AND THE SIGNIFICANCE O, 20F LCAO-MO POPULATION ANALYSIS.
by R. S. Mulliken. 18 Dec 61, 12p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-008:16

Descriptors: (*Molecular orbitals, *Wave functions), Hydrogen compounds, Fluorides, Ground state, Valance, Polarization, Chemical bonds, Atomic orbitals, Molecular energy levels, Dipole moments, Ions, Reviews.

Identifiers: Hydrogen fluoride.

Contents: Basis sets in LCAO-MO calculations (Minimal STO, extended STO, SCF-AO, and flexibilized and polarized SCF-AO basis sets; Comparison of SCF-MO calculations on HF using various basis sets; Balanced and unbalanced basis sets); Critical analysis and review of useful concepts in the AO and MO methods (Induced configuration mixing, Valence and coulomb polarization, Shrunken and swollen orbitals as partially promoted orbitals, Significance of LCAO-MO population analysis, Meaning of atomic charges); Criteria for good STO basis sets for SCF MO's, Balanced truncation in heteropolar molecules, Distortions caused by unbalanced truncation in polar molecules, Intraatomically unbalanced truncation in homopolar molecules); Dipole moments and ionicity from good MO wave functions (Dipole moments for good SCF-MO wave functions, Effect of limited configuration mixing on dipole moments, Net ionicity of SCF-MO wave functions).

AD-636 465 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
STUDIES IN MOLECULAR STRUCTURE. VIII. HE2 (; ;) IN THE SINGLE- AND MANY-CONFIGURATION LCAO MO SCF APPROXIMATION.
by Serafin Fraga, and Bernard J. Ransil. 6 Sep 61, 10p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-008:15
See also AD-636 470.

Descriptors: (*Molecular structure, Quantum mechanics), (*Helium, *Molecular orbitals), (*Wave functions, Helium), Molecular energy levels, Ions, Potential energy, Hydrogen.

Single- and many-configuration wave functions and their corresponding molecular energies are reported for the diatomic molecular ion He2 (++) in the LCAO MO SCF approximation for a wide range of internuclear distances. A potential curve displaying a minimum at 0.71A and a maximum at about 1.11A is obtained with omega-e=3295/cmand D-e=1.21 eV. Comparison with potential curves and correlation energies computed by the more accurate methods of Kolos, Roothaan, Weiss, Yoshimine, and McLean are made. The results are discussed with reference to stability and occurrence of the ion. Correlation energy is computed as a function of internuclear distance and compared with the isoelectronic analog H2. (Author)

AD-636 466 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
ELECTRIC DIPOLE POLARIZABILITY OF ATOMS BY THE HARTREE-FOCK METHOD. I. THEORY OF CLOSED-SHELL SYSTEMS.
by Howard D. Cohen, and C. C. J. Roothaan. 13 Apr 65, 5p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-3835:11

Descriptors: (*Dipole moments, Polarization), (*Atomic orbitals, *Hartree-Fock approximation), (*Wave functions, *Electric moments), Perturbation theory, Field theory, Electric fields, S-matrix, Hamiltonian, Integrals, Beryllium.

A method for the calculation of the dipole polarizabilities of closed-shell atomic systems is presented. This method involves the direct calculation of the Hartree-Fock wavefunction of the atom in the presence of the perturbing field. The orbitals are expressed as linear combinations of Slater-type functions. A large number of carefully chosen and optimized basis functions are used so as to assure a good fit to the true Hartree-Fock wavefunction. The polarizability is then calculated from the limiting value of alpha=p/F for F=O, where F is the electric field strength, and p is the induced dipole moment. (Author)

AD-636 467 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
HARTREE-FOCK-ROOTHAAN WAVEFUNCTIONS, POTENTIAL CURVES, AND CHARGE-DENSITY CONTOURS FOR THE HeH (+) (X SINGLET-SIGMA (+)) AND NeH (+) (X SINGLET-SIGMA (+)) MOLECULE IONS.
by Sigrid Peyerimhoff. 25 Jan 65, 13p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-3835:9

Descriptors: (*Helium group gases, *Molecular orbitals), (*Hydrides, Helium group gases), Helium, Neon, Ions, Hartree-Fock approximation, Potential energy, Chemical bonds, Ground state, Molecular association, Dissociation, Spectroscopy.

Identifiers: Helium group compounds, Helium hydrides, Neon hydrides.

Hartree-Fock-Roothaan wavefunctions for the ground state of the HeH (+) ion and the NeH (+) ion are reported. The potential curves for HeH (+) and NeH (+) are calculated using wavefunctions, which are optimized at the equilibrium distance and also at each internuclear distance, and their relative behavior is discussed. The Hellmann-Feynman forces on the nuclei are studied as a function of the internuclear distance with regard to the size of the basis set and optimization of the wavefunction. Spectroscopic data are calculate in different ways, a dissociation energy of 1.74 eV for HeH (+) and 2.03 eV for NeH (+) is computed, and calculations made to find the center of negative charge for every internuclear separation. Electron-density maps are plotted for several internuclear distances in HeH (+) and for the total wavefunction and the individual molecular orbitals of NeH (+) at the equilibrium distance. (Author)

AD-636 468 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
ELECTRONIC STRUCTURE OF DIATOMIC MOLECULES. III A. HARTREE-FOCK WAVEFUNCTIONS AND ENERGY QUANTITIES FOR N2 (X SINGLET-SIGMA-g (+)) AND N2 (+) (X DOUBLET-SIGMA-g (+), A DOUBLET-P1-u, B DOUBLET-SIGMA-u (+)) MOLECULAR IONS.
by Paul E. Cade, K. D. Sales, and Arnold C. Wahl. 3 Aug 65, 31p
Contract DA-11-022-ORD-3119, Grant NSF-GS-28
AROD-3835:12
See also AD-636 456. Prepared in cooperation with Argonne National Lab., Ill.

Descriptors: (*Diatomic molecules, *Molecular orbitals), (*Nitrogen, *Wave functions), (*Hartree-Fock approximation, Nitrogen), Ions, Molecular energy levels, Ground state, Spectroscopy.

The problem of the convergence of a sequence of Hartree-Fock-Roothaan wavefunctions and energy values to the true Hartree-Fock results is examined for N2 (X singlet-Sigma-g (+)). This critical study is based on a hierarchy of Hartree-Fock-Roothaan wavefunctions which differ in the size and composition of the expansion basis set in terms of STO symmetry orbitals. The concluding basis set gives a total Hartree-Fock energy of --108.9956 hartree and Re (HF)=2.0132 bohr for N2 (X singlet-Sigma-g (+)). Results are also presented from direct calculations for three states of the N2 (+) molecular ion which are also thought to be very close approximations to the true Hartree-Fock values. The results give EHF=-108.4079, -108.4320, and -108.2702 hartree and Re (HF)=2.0385, 2.134, and 1.934 bohr for the X doublet-Sigma-g (+), A doublet-Pi-u, and B doublet-Sigma-u (+)) states of N2 (+), respectively. Extensive calculations for various R values establish that the X doublet-Sigma-g (+) and A doublet-Pi-u states are reversed in order relative to experiment, a shortcoming ascribed to the Hartree-Fock approximation. (Author)

AD-636 469 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
STUDIES IN MOLECULAR STRUCTURE. VI. POTENTIAL CURVE FOR THE INTERACTION OF TWO HYDROGEN ATOMS IN THE LCAO MO SCF APPROXIMATION.
by Serafin Fraga, and Bernard J. Ransil. 13 Apr 61, 13p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-008:7
See also AD-636 461. Research supported in part by NSF.

Descriptors: (*Molecular structure, Quantum theory), (*Potential energy, *Hydrogen), (*Molecular orbitals, Hydrogen), Ground state, Wave functions, Chemical bonds, Ions, Atomic orbitals, Dissociation, Approximations (Mathematics).

The LCAO MO SCF method, both in the single-configuration and a limited configuration interaction approximation, was utilized to evaluate the potential curve of the ground state of H2; wave functions and total molecular energies are presented for a wide range of the internuclear distance (1.0a.u.<or=R<or=18.0a.u.). These solutions were used to construct potential curves for the ground states of the molecular ions H2 (+) and H2 (-) and for the lower-lying excited states of the neutral molecule. Results of vibration-rotation analyses for the stable states are presented. The results for a population analysis of the single-configuration ground-state function over the whole range of R are given, and compared to similar results for He2. (Author)

AD-636 470 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
STUDIES IN MOLECULAR STRUCTURE. VII. LIMITED CONFIGURATION INTERACTION FOR SELECTED FIRST-ROW DIATOMICS.
by Serafin Fraga, and Bernard J. Ransil. 1 Aug 61, 18p
Contract DA-11-022-ORD-3119
AROD-008:14
See also AD-636 469.

Descriptors: (*Molecular structure, Quantum mechanics), (*Diatomic molecules, *Molecular orbitals), (*Wave functions, Diatomic molecules), Molecular energy levels, Dipole moments, Probability, Approximation (Mathematics), Lithium compounds, Boron compounds, Nitrogen compounds, Hydrides, Fluorides, Carbon monoxide, Hydrogen compounds, Lithium, Carbon, Nitrogen, Fluorine.

Identifiers: Boron hydrides, Boron fluorides, Hydrogen fluoride, Imidogen, Lithium hydride, Lithium fluoride.

Calculations on selected first-row diatomic molecules using a limited configuration interaction with minimal LCAO MO SCF wave functions are described. Molecular energies, dipole moments, and population analyses are tabulated and discussed. These results provide an extensive foundation for a tentative evaluation of the value of limited configuration interaction for LiH, BH, NH (d singlet-Sigma (+)), HF, Li2, C2, N2, F2, LiF, CO, AND BF within the limits of the approximations used. (Author)

AD-636 471 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
CHARGE DISTRIBUTION, HYBRIDIZATION, AND BONDING IN ACETYLENE AND CARBON DIOXIDE.
by A. D. McLean, B. J. Ransil, and R. S. Mulliken. 31 Mar 60, 1p
AROD-008:2

Descriptors: (*Molecular orbitals, analysis), (*Alkynes, Molecular orbitals), (*Carbon dioxide, Molecular orbitals), Wave functions, Chemical bonds, Probability.

For abstract, see T 66 18.

AD-636 472 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
LCAO-MO-SCF GROUND STATE CALCULATIONS ON C2H2 AND CO2.
by A. D. McLean. 14 Dec 59, 2p
Contract DA-11-022-ORD-3119
AROD-008:1

Descriptors: (*Molecular orbitals, Analysis), (*Alkynes, Molecular orbitals), (*Carbon dioxide, Molecular orbitals), Ground state, Molecular energy levels, Chemical bonds.

For abstract, see T 66 18.

AD-636 473 **Field 7D**
Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
STUDY OF TWO-CENTER INTEGRALS USEFUL IN CALCULATIONS ON MOLECULAR STRUCTURE. V. GENERAL METHODS FOR DIATOMIC INTEGRALS APPLICABLE TO DIGITAL COMPUTERS.
by Arnold C. Wahl, Paul E. Cade, and C. C. J. Roothaan. 21 Apr 64, 22p
Contract DA-11-022-ORD-3119, Grant NSF-GP-28
AROD-3835:4

Descriptors: (*Molecular structure, Integrals), (*Diatomic molecules, *Molecular orbitals), Atomic orbitals, Programming (Computers), Numerical analysis, Integration, Electrons, Special functions (Mathematical).

The calculation of the electronic structure of atomic and molecular systems involves the determination of a number of integrals over the electronic coordinates. These calculations are feasible only by the use of high-speed, large-memory digital computers. This discussion is based on a culmination of experience obtained in this laboratory with regard to methods useful in the evaluation of two-center integrals by means of digital computers. The ground work for this paper, in terms of the analysis employed, is given in a series of papers by Roothaan, Ruedenberg, and Jaunzemis, but significant changes have evolved which offer considerable improvements and more economical calculations. The analysis presented is especially the result of efforts to take full advantage of the capabilities of present digital computers. The methods advocated are thought to be near optimal to a completely reliable and automatic computation of the electronic integrals in question with the desired accuracy. A not insignificant aspect of the methods given here is that an approach was sought which is unfailingly reliable and accurate regardless of the AO's involved in the integrals and at the same time as economical as possible. (Author)

AD-636 498 **Field 7D, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
INTENSITY MEASUREMENTS OF SOME FUNDAMENTAL ABSORPTION BANDS OF LIQUID H2O, D2O, AND CS2.
Interim rept.
by R. E. Kagarise. 27 May 66, 11p NRL-6394
Proj. RR-001-01-43-4803

Descriptors: (*Water, Absorption spectrum), (*Heavy water, Absorption spectrum), (*Carbon compounds, *Sulides), (*Infrared spectroscopy, Instrumentation), Band spectrum, Intensity, Containers, Optical equipment.

Identifiers: Carbon disulfide.

Techniques for fabricating and calibrating liquid absorption cells having path lengths of about 1 micron were developed. The thin spacers required for such cells were formed by the vacuum deposition of aluminum directly onto the cell windows. The path lengths of the assembled cells were determined by the well known interference fringe method. However, in order to produce discernible fringes in the visible and near-ultraviolet spectral regions, it was necessary to polish the internal surfaces of the cell windows to a high degree of flatness. Using such cells, several very intense bands of H2O (3410 and 1645/cm), D2O (2510/cm), and CS2 (1510/cm) were measured. The absorptivity values obtained for H2O and D2O appear to be significantly higher than those reported previously, while the integrated intensity of the NU-3 band of CS2 is somewhat less than that calculated from dispersion and reflectance data. Distortion of the cell by the liquid sample and photometric accuracy of the spectrometer are briefly discussed as possible sources of systematic error. (Author)

AD-636 517 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Cornell Univ., Ithaca, N. Y. Dept. of Engineering Physics.
SURFACE PHYSICS OF METALS AND METAL OXIDES.
Final technical rept. 1 Jan 58-30 Jun 66.
by T. N. Rhodin. 30 Jun 66, 33p TR-12
Contract Nonr-401 (31)
Proj. NR-036-035

Descriptors: (*Metals, Oxidation), (*Oxides, Physical chemistry), Films, Nucleation, Diffusion, Epitaxial growth, Chemisorption, Reaction kinetics, Nitrogen, Tungsten, Surface properties, Crystal lattice defects.

The mechanisms of atomic and molecular processes occurring on metal and metal oxide surfaces were critically investigated from a theoretical and experimental viewpoint. Particular emphasis was placed on the role of crystalline imperfections and surface crystallography on such processes as chemisorption, oxide initiation, oxide film growth, surface diffusion and nucleation and growth from the vapor or gas phase. Limits of validity of the Wagner-Hauffe model for diffusion-controlled oxide film growth on pure magnesium and its alloys eres established. The Bloomer model for oxide nuclei growth was also critically evaluated. A generalized model for the chemisorption of beta-nitrogen on tungsten was developed. Clarification of the contribution of point defects to the diffusion of oxygen in magnesium oxide and their application to oxidation and electrical conductivity in metal oxides was achieved. The capillarity theory of heterogeneous nucleation of metal oxides and vapors onto solid surfaces was modified and extended to the case of very small critical clusters in terms of a petit canonical assembly approach.

AD-636 528 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Princeton Univ., N. J. Plasma Physics Lab.
PROPAGATION OF CORRELATIONS IN A BOLTZMANN GAS.
Scientific rept.
by Edward A. Frieman, and Robert Goldman.
May 66, 66p PPL-AF-2
Contract AF 49 (638)-1555

Descriptors: (*Statistical mechanics, *Gases), Statistical functions, Propagation.

New results are obtained on the propagation of correlations in a Boltzmann gas on the scale of the mean free path and the collisional time scale which appear to support a conjecture of M. Green's on this subject. (Author)

AD-636 536 **Field 7D, 20L, 11B**
CFSTI Prices: HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
STRUCTURE AND PHYSICAL PROPERTIES OF SOLID AND LIQUID VANADIUM PENTOXIDE.
Technical rept.
by T. Allersma, R. Hakim, T. N. Kennedy, and J. D. Mackenzie. Jun 66, 30p TR-2
Contract Nonr-591 (21)

Descriptors: (*Vanadium compounds, Physical properties), Oxides, Semiconductors, Solids, Liquids, Crystal structure, Oxygen, Vapor pressure, Resistance (Electrical), Heat of activation, Electrical conductance, Films, Phase studies.

Identifiers: Vanadium pentoxide.

The electrical resistivity of near-stoichiometric crystalline V2O5 was measured as a function of crystal orientation and oxygen partial pressure from 25C to 300C. Conductivity is insensitive to ambient atmosphere. The activation energy for conduction is 0.20 ev. Molten V2O5, however, is sensitive to oxygen partial pressure. Its conductivity is proportional to P-O2 to the -1/6th power. Anomalously high electrical resistivity was observed for glassy V2O5 films. (Author)

AD-636 544 **Field 7D, 20B**
CFSTI Prices: HC$1.00 MF$0.50
Oregon State Univ., Corvallis. Dept. of Chemistry.
POLARIZATION AND RECOVERY OF SINCLE CRYSTAL VANADIUM PENTOXIDE ELECTRODES.
Technical rept.
by Allen B. Scott, Kenneth R. Newby, and Charles Bryden. 15 Jul 66, 12p TR-2
Contract Nonr-1286 (08)
Proj. 010-01-02
Rept. on Electrochemistry of Primary Oxide Electrodes.

Descriptors: (*Electrodes, *Vanadium compounds), (*Single crystals, Vanadium compounds), (*Crystal growth, Vanadium compounds), Polarization, Oxides, Manganese compounds, Electrochemistry.

Identifiers: Managanese dioxide, Vanadium pentoxide.

A method for the growth of single crystals of V2O5, as thin plates, is described. The cathodic polarization and recovery in a buffer solution saturated with V2O5, resembles qualitatively that of polycrystalline V2O5 and MnO2. Attempts to fit the polarization and recovery curves by means of a theoretical equation applicable to MnO2 were only partially successful. (Author)

AD-636 561 **Field 7D**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
ELECTRON PARAMAGNETIC RESONANCE STUDY OF SOLUTIONS OF EUROPIUM IN LIQUID AMMONIA.
by D. S. Thompson, E. E. Hazen, and J. S. Waugh. 12 Nov 65, 5p
Contract DA-36-039-AMC-03200 (E)

Descriptors: (*Europium, *Paramagnetic resonance), (*Ammonia, solutions), Electrons, Hyperfine structure, Excitation, Atomic energy levels, Absorption spectrum.

Identifiers: Metal-ammonia solutions.

The electron spin resonance spectrum of a solution of Eu in liquid ammonia consists of a single line characteristic of the solvated electron and a complex hyperfine pattern which is shown to arise from Eu (2+), octet-S7/2 with a small admixture of excited states. T2 for the electron decreases sharply with increasing concentration in contrast with other metal-ammonia solutions, whereas the change in T2 for the Eu (2+) is slight. The solutions decompose by a heterogeneous mechanism that involves strong adsorption on the walls of the container. (Author)

AD-636 605 **Field 7D, 6A**
CFSTI Prices: HC$3.00 MF$0.75
RAND Corp., Santa Monica, Calif.
ON MEMBRANE EQUILIBRIA.
by N. Z. Shapiro, and L. S. Shapley. Jul 66, 68p
RM-4464-PR
Contract AF 49 (638)-1700

Descriptors: (*Membranes, Chemical equilibrium), (*Chemical equilibrium, Mathematical analysis), Liquids, Gases, Semipermeability, Osmosis, Membranes (Biology), Theory, Thermodynamics.

The study mathematically investigates equilibrium properties of certain two-phase chemical systems. The different types of equilibrium compositions and the conditions that govern them are determined. The effects of linear variation in the chemical inputs are studied; e.g., the effects on a multisubstance fluid, separated by a semipermeable membrane, to which another fluid is slowly added. Among other results, it is shown that the relative sizes of the two phases will always change monotonically, but that the absolute sizes may fluctuate. (Author)

AD-636 626 **Field 7D, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wrighht-Patterson AFB, Ohio.
THE STRUCTURAL-KINETIC INVESTIGATION OF THE PROCESS OF OXIDATION OF NICKEL, CROME, AND ALLOYS BASED UPON THEM.
by D. V. Ignatov, and R. D. Shamgunova. 2 Mar 66, 16p FTD-TT-65-1275
TT-66-61937
Unedited rough draft trans. of Issledovaniya po Zharoprochnym Splavam (USSR) v4 p346-51 1959.

Descriptors: (*Oxidation, Nickel alloys), (*Nickel alloys, Chromium alloys), Oxides, Films, Aluminum alloys, Titanium alloys, Antioxidants, Corrosion resistance, Chromium compounds, Nickel compounds, Microstructure, Diffusion, High-temperature research, Corrosion inhibition, USSR.

The speed of oxidization of a binary alloy containing 80% Ni and 20% Cr is less than the speed of oxidization of chrome at temperatures of 800 - 1000C. The oxide films originating on this alloy consist at 400C of oxide of nickel (Ni0); at 500 - 700C they consist of oxide of chrome (alpha - Cr203); at 800 - 1000C - of two layers of various compositions. The surface layer of the oxide film consists of an oxide of the spinel type (NiCr204). That of the inside layer consists of oxide of chrome (alpha - Cr203). The speed of oxidization of the nickel-chrome alloy decreases with additions of aluminum. For a satisfactory protection of the alloy Ni-Cr from oxidization up to a temperature of 900C an aluminum content in a quantity of 4 - 5% suffices and at 1000C, 7% suffices. Oxide films forming on alloys with 1% of aluminum with 4.18% A1, 7.22% A1, and 10% A1 at 400C, consist of oxide films of Ni0; at 500 - 600C, they consist of oxide of chrome alpha - Cr204; at 700 - 1000C, they consist of solid solutions of oxides of the spinel type, NiCr204, NiA1204, and gamma - A1203. Oxide of aluminum is concentrated in the inner layers of the oxide film. Slight additions of titanium (0.68%) decrease the speed of oxidization of the Ni-Cr alloy and large additions increase it. The process of oxidization of the given alloys is principally caused by the diffusion of the ions of the metals.

AD-636 629 **Field 7D, 4B**
CFSTI Prices: HC$1.00 MF$0.50
American Meteorological Society, Boston, Mass.
THE EFFECT OF SURFACE-ACTIVE SUBSTANCES ON THE EVAPORATION RATE OF SOLUTION DROPLETS AND ON THE RATE OF WATER-VAPOR CONDENSATION ON THESE DROPLETS.
Research translation.
by L. I. Vdovenko, and L. M. Roev. May 66, 11p
T-R-551
Contract AF 19 (628)-3880
TT-66-61926
Vliyanie Poverkhnostno-Aktivnykh Veshchestv na Skorost Ispareniya Kapel Rastvora i Kondensatsiya na nikh Parov vody, trans. of Ukrainskii Nauchno-Issledovatelskii Gidro-Meteorologicheskii Institut. Trudy (USSR) n47 p17-21 1965.

Descriptors: (*Surface-active substances, *Evaporation), Water, Drops, Water vapor, Condensation, USSR.

This paper treats the effect of surface-active cationic substances (SAS) on the evaporation rate of droplets of pure water and of a solution of NaCl, and the condensation of water vapor on the drops in the solution. It was found that the SAS investigated reduces the evaporation rate of pure water droplets by two orders of magnitude, but has practically no effect on either the condensation growth or the evaporation of the solution droplets. (Author)

AD-636 639 **Field 7D, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EVALUATION OF THE QUALITY OF SPRAY OBTAINED DURING ULTRASONIC DISPERSION OF LIQUIDS AND MELTS.
by V. F. Popov. 21 Mar 66, 14p FTD-TT-65-1960
TT-66-61927
Unedited rough draft trans. of Khimicheskaya Promyshlennost (USSR) n12 p898-901 1964.

Descriptors: (*Sprays, Physical properties), Distribution, Scattering, USSR, Ultrasonic radiation, Melting, Drops, Mathematical analysis.

For abstract, see T 66 18.

AD-636 653 **Field 7D, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ANALYSIS OF NUCLEAR MAGNETIC SPECTRA OF MULTINUCLEAR SPIN SYSTEMS.
by Chiu Tsu-wen, Yu Ling-hwa, and Hwa Shyhing. 23 May 66, 20p FTD-TT-65-1086
TT-66-61941
Edited trans. of Chung-Kuo K'o Hsueh Yuan Ying Yung Hua Hsueh Yen Chiu So Chi K'an (Chinese People's Republic) n11 p9-22 1964.

Descriptors: (*Pyridines, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Analysis), (*Nuclear spins, Organic compounds), Wave functions, Molecular energy levels, Matrix algebra, Approximation (Mathematics), Spectroscopy, China.

Since Swalen, Reilly and Kowalewski have successfully explained the high-resolution nuclear magnetic spectra of several ring oxygen compounds and 3-substituted pyridine by the use of the ABX and ABXY as basis and introduced a second-order perturbation, there is reason to believe that multinuclear molecules may also be studied successfully with a similar approach. This paper develops the energy levels and wave-function diagrams of compounds of the types AnBK, ABKn, AnBKL and ABKLn using Corio's method of treating the multinuclear wave function as the basic function. In the case of 3-substituted pyridine, the expected condition is not completely and strictly satisfied. But, the specific results are not too different from the direct ones obtained by diagnolization. Hence it has become one of the most important methods of analyzing the wave functions of multinuclei spin systems. Due to the lack of a 60-Mc/s high-resolution spectrum, there was no specific numerical check on the results as presented in this paper. (Author)

AD-636 680 **Field 7D, 20C**
CFSTI Prices: HC$3.00 MF$0.75
Honeywell Research Center, Hopkins, Minn.
MECHANISMS OF LASER-SURFACE INTERACTIONS.
Final rept.
by J. F. Ready, E. Bernal G, and L. P. Levine.
May 66, 100p
Contract DA-11-022-AMC-1749 (A)

Descriptors: (*Photoelectric effect, *Lasers), (*Mass spectroscopy, Photoelectric effect), (*Spectrum analyzers, Mass spectroscopy), Metals, Surface properties, Adsorption, Gases, Plasma physics.

The work described in this report deals with the measurement of particle emission from metal surfaces irradiated with light flux densities of 50-70 Mw/sq cm, as well as calculations of the velocity distribution of the particles from the measured pulse shapes. Measurements in the quadrupole mass spectrometer have shown that, besides the thermal gas desorption, the neutral particle emission contains a photon pulse and several high velocity non-zero-mass pulses. Tentative assignments of masses and energies of the high speed neutral pulses are made. (Author)

AD-636 682 **Field 7D, 4A, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Basel Univ. (Switzerland). Inst. of Physics.
ANALYSIS OF THE SPECTRUM OF THE NITRIC OXIDE MOLECULE.
Final scientific rept.
by E. Miescher. 31 Mar 66, 8p
Grant AF-EOAR-109-63
AFCRL-66-440

Descriptors: (*Nitrogen compounds, Spectroscopy), Oxides, Absorption spectrum, Spectra (Visible + ultraviolet), Spectra (Infrared), Continuous spectrum, Molecular energy levels, Switzerland.

Identifiers: Nitrogen oxygen.

The spectrum of the NO molecule was studied experimentally. The publications of results are listed. A short description of the observed doublet-delta states and of Rydberg - complexes is given. Problems left for future work on the NO - spectrum are discussed. (Author)

AD-636 688 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
ANALYSIS OF BINARY GAS MIXTURES BY THERMAL CONDUCTIVITY.
Interim rept.
by Uriel Sokolov. 10 Aug 65, 13p Scientific-3
Contract AF 61 (052)-655
Rept. on The Photochemical Evolution of Oxygen.

Descriptors: (*Gas analysis, Thermal conductivity), Mixtures, Hydrogen, Pressure, Measurement.

A method for the analysis of a binary mixture, one of the components of which is hydrogen by the simultaneous determination of the heat conductivity and the pressure of the mixture, is described. The empirical calibration curves are strictly linear. Total pressures of 2 X 10 to the minus 7th power moles of gas can be analyzed by this method with an accuracy which may reach plus or minus 1%. (Author)

AD-636 703 **Field 7D, 11F**
Missouri Univ., Rolla.
SURFACE DISINTEGRATION OF ZINC MONO- AND POLYCRYSTALS DISSOLVING ANODICALLY IN SODIUM BROMATE SOLUTIONS AND THE APPARENT VALENCY OF ZINC IONS.
Technical rept.
by M. E. Straumanis, and Y. Wang. 12 Nov 65, 7p TR-14
Contract Nonr-2296 (03)

Descriptors: (*Zinc, Electrochemistry), Single crystals, Surfaces, Decomposition, Solutions, Sodium compounds, Bromates, Electrodes, Valence, Corrosion, Crystal structure.

Zinc, if dissolved anodically in an aqueous 3 percent NaBrO3 solution apparently deviates from Faraday's law in the sense that more Zn goes into solution than calculated. It can be proved that this disagreement is due to partial surface disintegration of the Zn anode while current is flowing. Very small particles of Zn are carried away from the anode when the surface oxide film detaches. The flakes are dark due to the presence of fine metallic particles. In moisture, the latter are oxidized quickly and turn white. The amount of disintegration (including the self-dissolution) is between 25 and 31 percent of the total Zn weight loss. Anodic disintegration decreases for Zn electrodes containing Au. The amount of disintegration is nearly independent of the crystallographic plane of the single Zn crystal and agrees with that of a polycrystal. The reasons for and the mechanism of disintegration are discussed. (Author)

AD-636 719 **Field 7D, 20M, 20D**
CFSTI Prices: HC$1.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Applied Mathematics.
MIXTURES OF MAXWELL MOLECULES.
Technical rept.
by Lawrence Sirovich. Jun 66, 14p TR-4, Nonr-562 (39)/4
Contract Nonr-562 (39)
Proj. NR-061-157

Descriptors: (*Kinetic theory, Integrals), (*Molecules, Statistical distributions), Gases, Energy, Excitation, Transport properties, Mixtures.

The linearized collision integrals for mixtures of Maxwell molecules is considered. A simple proof of the eigentheory is given. Relations for and amongst eigenvalues are obtained. A brief discussion of the corresponding relaxation theory is also included. (Author)

AD-636 736 **Field 7D, 14B, 7E**
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
A COMPUTER-COUPLED QUALITY CONTROL PROCEDURE FOR GAMMA-RAY SCINTILLATION SPECTROMETRY.
by D. F. Covell. 25 Apr 66, 20p USNRDL-TR-1034
Proj. T/6409

Descriptors: (*Gamma-ray spectroscopy, Quality control), Statistical analysis, Data processing systems, Computers, Reliability, Nuclear spectroscopy, Spectrum analyzers.

Identifiers: Statistical analyzers.

Long-term stabilization of instrumental performance is necessary for gamma-ray scintillation spectrometry whether used for nuclear spectroscopy studies or for radionuclide identification and estimation. This requirement is especially important if high-precision measurements are to be made on a routine basis. It is proposed to achieve sufficient stabilization through statistical quality control, a technique used to maintain the quality of output of a process or system. A quality control procedure was devised which consists of periodic measurement of a current standard spectrum and comparison of it, on a channel-by-channel basis on a computer, with a reference standard spectrum. Significant differences between the two spectra are interpreted as machine deviations that require correction. As part of the procedure, values obtained from this measurement are charted so that current and past performance can be compared easily. This makes possible a prompt awareness of unusual changes in performance. Application of the technique has resulted in improved stability, improved reliability, and reduced maintenance. Approximately 20 minutes of technician time are required per day to apply this procedure to a single instrument. Less time per instrument is required when several instruments are simultaneously controlled. (Author)

AD-636 770 **Field 7D, 7C**
Explosives Research and Development Establishment, Waltham Abbey (England).
REACTIONS OF THE ISOPROPOXYL RADICAL. PART II. PRESSURE DEPENDENCE AND KINETICS OF PYROLYSIS AT 160-200C IN THE GAS PHASE.
by D. L. Cox, R. A. Livermore, and L. Phillips. 1966, 8p OFFPRINT-66/3, WAC/172/031

Descriptors: (*Free radicals, *Pyrolysis), Alcohols, Nitrites, Pressure, Reaction kinetics, Gases, Great Britain.

Identifiers: Isopropyl nitrites.

The pressure dependence of the pyrolysis of the isopropoxyl radical was demonstrated in the gas phase at 160-200C/20-230 mm., using isopropyl nitrite-nitric oxide mixtures. The reaction is in the transition region between first- and second-order. High- and low-pressure limiting values of the rate constant were determined, with E-infinity = 17.3 and E-null=8.3 kcal/mol, corresponding to twenty effective oscillators in the activated state, and A-infinity = 10 to the 11.8th power/sec. and A-null = 10 to the 13.1th power/mole/cc/sec. The efficiency in energy transfer of a wide range of added, chemically inert gases was examined: molecules structurally similar to the isopropoxyl radical appear to have the highest efficiency. (Author)

AD-636 782 **Field 7D**
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
DIELECTRIC RELAXATION IN THE CLATHRATE HYDRATES OF SOME CYCLIC ETHERS.
by R. E. Hawkins, and D. W. Davidson. 14 Dec 65, 7p NRC-9041

Descriptors: (*Clathrate compounds, Dielectric properties), (*Ethers, Clathrate compounds), Hydrates, Molecular structure, Relaxation time, Canada.

By comparison of the low-frequency dielectric properties of the propylene oxide-, trimethylene oxide-, and dihydrofuran-water systems with those of the known clathrate hydrate of tetrahydrofuran, it is shown that these cyclic ethers (M) also form gas hydrates of von Stackelberg's structure II, with compositions close to M.17H2O. The shapes and amplitudes of the dispersion curves associated with reorientation of the water molecules are identical within the experimental error for all four hydrates. The shapes are slightly broader than Debye curves. The relaxation times of the water structure depend somewhat on the nature of the encaged molecules M. The extremely rapid reorientation of the M molecules gives a contribution to the high-frequency dielectric constant which is proportional to (mu sub M) sq. and somewhat higher than predicted by the Onsager cavity model. Trimethylene oxide, the smallest of these molecules, forms a second clathrate hydrate, probably of structure I. In it the water molecules relax more rapidly than in structure II. (Author)

AD-636 850 **Field 7D, 6A**
Army Biological Labs., Frederick, Md.
DIFFUSION MEASUREMENTS IN AGAR GEL.
by Edward J. Schantz, and Max A. Lauffer. 1 Mar 62, 6p

Descriptors: (*Gels, *Diffusion), Test methods, Salts, Carbohydrates, Amino acids, Proteins.

An improved method for the employment of agar gel as a medium for diffusion measurements and a mathematical treatment of the data for the calculation of diffusion coefficients are described. Diffusion is allowed to proceed under controlled conditions into a column of agar gel held in a cell made of a 50-ml hypodermic syringe that has had the needle end of the barrel cut off. By means of a micrometer the gel is pushed from the cell, sectioned with a fine wire, and assayed. The use of arithmetic probability paper affords a convenient means of plotting the data, making necessary correction for the presence of the gel, and calculating diffusion coefficients. Advantages include the possibility of using mixtures and very dilute solutions. Coefficients obtained on some salts, sugars, amino acids, and proteins are in agreement with those obtained by free diffusion. (Author)

AD-636 858 **Field 7D, 14B**
Army Biological Labs., Frederick, Md.
A PARTICLE SIZE ANALYZER FOR AEROSOLS.
by Victor R. Mumma, Albert L. Thomas Jr, and Robert H. Collins III. 1962, 12p
Prepared in cooperation with Southern Research Inst., Birmingham, Ala.

Descriptors: (*Aerosols, *Particle size), Instrumentation, Geometric forms, Light, Scattering, Air pollution.

An instrument for counting and sizing aerosolized particles is described. It is based on the observation of scattered light as the particles pass through an illuminated area. The application of the device to the study of particle shape is described, and its application to practical uses is indicated. (Author)

AD-636 917 **Field 7D**
CFSTI Prices: HC$4.00 MF$0.75
Materials Advisory Board, NAS-NRC, Washington, D. C.
THEORETICAL STRENGTH OF MATERIALS.
Final rept.
Aug 66, 121p MAB-221-M
Contract DA-49-083-OSA-3131

Descriptors: (*Materials, Molecular association), Theory, Solids, Crystals, Glass, Polymers, Anisotropy, Heat of activation, Dissociation, Mathematical analysis, Stresses.

This report is in six sections, i.e., Introduction, Theoretical Considerations for Ideal Solids, Cohesive Strength of Crystals, Strength of Inorganic Glassy Solids, Strength of Organic Polymers, and Examples of Theoretical Strength Calculations. Equations suitable for engineering purposes are developed for each class, along with a discussion of the assumptions involved, and the limitations and uncertainties applicable to the expression of strength in terms of other properties which are measurable experimentally. The report sets forth the considerations upon which the concept of theoretical strength is based, the methods by which calculations can be made, the information required to make the calculations quantitative, the sources of such information, and the level of confidence to be placed upon the results applicable to various types of materials. (Author)

AD-636 927 **Field 7D, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
DESIGN AND CONSTRUCTION OF A MODIFIED LOZIER TUBE FOR IONIZATION STUDIES NOT INVOLVING MASS ANALYSIS.
Final scientific rept., Sep 64-Sep 65.
by K. R. Ryan, and C. D. Miller. Apr 66, 27p
ARL-66-0072
Proj. AF-7023
Task 702303

Descriptors: (*Ionization, Spectroscopy), (*Spectrum analyzers, Design), Electrons, Kinetic energy, Electrostatics, Reaction kinetics, Construction.

Identifiers: Lozier tubes.

The report discusses the design parameters, construction, and some potential applications of an electron impact device which does not provide for mass analysis. Such a device was described by Lozier in 1930 but has not been used extensively since the use of mass spectrometers to study the ionization of molecules has become more general. Mass analysis obviously provides essential information on ionization processes, but the ion sources used in mass spectrometry introduce some generally unknown degree of mass and energy discrimination. The Lozier tube therefore offers some promise as a device to supplement mass spectrometric studies of ionization processes. (Author)

AD-636 957 **Field 7D, 18H**
Frankford Arsenal, Philadelphia, Pa. Research and Development Directorate.
GAMMA-RAY ENHANCED DIFFUSION IN ALPHA-BRASS.
by R. E. Larsen, and A. C. Damask. Oct 64, 14p
Proj. DA-1C014501B11A
FA-A64-15

Descriptors: (*Radiation damage, Brass), (*Brass, Diffusion), Gamma rays, Crystal lattice defects, Impurities.

Enhanced diffusion in alpha-brass was studied under gamma irradiation. The parameters varied were the flux, the temperature, and the dislocation content of the alloy. It was found that the diffusion enhancement is highly sensitive to the state of cold work of the material and that the enhanced diffusion coefficient can be reduced by a factor of five by a reduction in cross-sectional area of 0.5%. The flux dependence, although not precise, is concluded to be linear over the range of 0.000017 r/hr to 0.0000047 r/hr. The temperature dependence is composed of a temperature dependent and a temperature independent part and it is shown that the data cannot be described by any of the three mechanisms of enhanced diffusion originally proposed by Dienes and Damask. A fourth mechanism is proposed in which a fraction of the vacancies anneal to dislocations and the remainder recombine with their own interstitials. It is shown that the data fit such a theory very well. On the basis of this model and the enhanced diffusion data of Arndt and Hines, which gave the migration energy of the vacancy as 0.8 eV, the migration energy of the interstitial is calculated to be 0.4 eV. The enhancement of diffusion by radiation permits the achievement of low temperature equilibrium states in alloys. The data obtained by this method show that the critical temperature for long-range order in 30% Zn alpha-brass lies below 41C, and kinetic evidence is presented which indicates that the critial temperature probably lies even below 0C. (Author)

AD-637 006 **Field 7D, 20J**
Uppsala Univ. (Sweden). Quantum Chemistry Group.
CORRELATED WAVE FUNCTIONS FOR THREE ELECTRON IONS.
by Yngve Ohrn, and Jan Nordling. 15 Jan 66, 8p
Scientific-4
Contract AF 61 (052)-874
ARL-66-0151

Descriptors: (*Ions, *Wave functions), (*Lithium, Wave functions), (*Atomic energy levels, Wave functions), Ground state, Beryllium, Boron, Carbon, Nitrogen, Oxygen, Sweden.

A scheme for automatic calculation of correlated wave functions and total non-relativistie energies for the three electron ions is developed and applied to the three lowest ns doublet-S-terms of the lithium atom. In addition ground state energies and wave functions are calculated for Be (+), B (2+), C (3+), N (4+) and O (5+). (Author)

AD-637 035 **Field 7D, 20A**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
ULTRASONIC ABSORPTION IN AQUEOUS POLYETHYLENE GLYCOL SOLUTIONS.
by Gordon G. Hammes, and Thomas B. Lewis.
9 Dec 65, 5p
Contract DA-36-039-AMC-03200 (E), Grant PHS-GM-07803
Grant PHS-GM-13292

Descriptors: (*Glycols, *Ultrasonic radiation), (*Polymers, Ultrasonic radiation), Ethylenes, Acoustic properties, Absorption, Relaxation time, Molecular association, Viscosity, Chemical equilibrium, Volume, Solvents, Water.

Identifiers: Polyethylene glycols, Sonochemistry.

The ultrasonic absorption and velocity in aqueous solutions of polyethylene glycol of molecular weights 20,000 and 7500 have been measured over the frequency range 10 to 185 Mc/sec. A single relaxation process is observed over the concentration, temperature, and frequency range investigated. The high-frequency limiting value of the absorption always exceeds that of water, which suggests that the water structure is altered owing to the presence of polymer and/or further relaxation processes occur at higher frequencies than employed in this investigation. The relaxation times determined from the data are essentially independent of concentration, temperature, and molecular weight; the maximum of the absorption per wavelength is approximately proportional to the polymer concentration. Viscosity measurements on the polymer solutions and use of the Zimm theory of viscous relaxation indicates that viscous relaxation is not being observed. The relaxation process is attributed to a perturbation of the hydrogen-bonding equilibrium between polymer and solvent. Minimum volume changes of approximately plus or minus 0.6 ml/mole of monomer are associated with this equilibrium. The general use of ultrasonic absorption measurements as a probe of microscopic solvent structure is considered. (Author)

AD-637 053 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
PROBLEMS OF PHYSICAL CHEMISTRY: SELECTED ARTICLES.
by S. E. Kupriyanov. 2 Mar 66, 41p FTD-MT-65-226
TT-66-62030
Edited machine trans. of Problemy Fizicheskoi Khimii (USSR) n3 p66-75, 76-85 1963.

Descriptors: (*Mass spectroscopy, Microanalysis), (*Dissociation, Mass spectroscopy), Gases, Impurities, Spectrum analyzers, Sensitivity, Ions, Scattering, Atoms, Molecules, Methane, USSR.

Identifiers: Particle interactions.

Contents: Mass spectrometric methods of determining small quantities of impurities, by S. Ye. Kupriyanov; Double mass spectrometer for the investigation of dissociation of ions during collision with atoms and molecules of different gases, by S. Ye. Kupriyanov.

AD-637 066 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EMPIRICAL CALCULATION OF THE DISSOCIATION ENERGIES OF BORON-CONTAINING BONDS.
by Chia-lai Pan. 9 May 66, 6p FTD-TT-65-1044
TT-66-62039
Edited trans. of Hua Hsueh T'ung Pao (Chinese People's Republic) n5 p53-4 1964.

Descriptors: (*Boron compounds, *Chemical bonds), Dissociation, Energy, Equations, Stability, Ionization potentials, China, Amines, Boranes.

Identifiers: Aminoboranes.

Pauling's empirical equation is suitable in the calculation of energies of boron-containing bonds. The discrepancy between the calculated and experimental values of B-NMe2 is relatively large. This could be due to the fact that the double bond character of the compound is not taken into consideration. From the energy and from the ionic character, it is possible to determine the relative stability of the various boron bonds. (Author)

AD-637 075 **Field 7D, 3B**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
ON THE EXCITED LEVELS OF Fe VIII.
Revised ed.
by S. J. Czyzak, and T. K. Krueger. 3 Oct 65, 31p
ARL-66-0094
Proj. AF-7114
Revision of manuscript submitted 7 Jun 65.

Descriptors: (*Iron, *Wave functions), (*Atomic energy levels, Iron), Ground state, Excitation, Electron transitions, Selection rules, Probability.

Wave functions for the ground state and certain excited levels of Fe VIII (3d, 3p (5) 3d (2), 4s, 4p, 4d, 4f, 5s, 5f, 6s, 6f, 7f) were computed to determine the allowed and forbidden transition probabilities. Collision strengths for allowed transitions were determined from the method devised by van Regemorter and compared with the semiclassical method of Seaton and extended to positive ions by Burgess. (Author)

AD-637 076 **Field 7D, 14B**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
METHOD FOR STUDYING LOW ENERGY ION-MOLECULE REACTIONS USING MONOENERGETIC IONS.
Revised ed.
by Keith R. Ryan, Jean H. Futrell, and C. Dean Miller. 16 Aug 65, 8p ARL-66-0095
Proj. AF-7023
Task 702301
Revision of manuscript submitted 13 May 1965.

Descriptors: (*Ions, Chemical reactions), (*Methane, Ions), (*Thermochemistry, Instrumentation), Kinetic energy, Electric fields, Gas ionization, Molecules.

An experimental technique is described for the study of ion-molecule reactions permitting the investigation of ions with kinetic energies in the range 0-3 eV which introduces negligible spread in ion energy. A 20 nsec ionizing pulse is used to produce ions in the reaction chamber to which a steady dc electric field is applied. Because of the short time interval for ionization all ions have essentially the same energy and move as a 'bunch' under the influence of the applied field. Thus the energy of the ions at any subsequent time may be readily calculated, and the energy dependence of ion-molecular interactions may be studied. Practical considerations, determined by source dimensions, limited the maximum energy to 1.3 eV in the present study for the reaction CH4 (+) + CH4 (to) CH5 (+) + CH3. (Author)

AD-637 080 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Goettingen Univ. (West Germany). Institut Fuer Physikalische Chemie.
INVESTIGATIONS OF THE THERMAL DECOMPOSITION OF SMALL MOLECULES, ESPECIALLY AT HIGH PRESSURES.
Final scientific rept.
by H. A. Olschewski, J. Troe, and H. Gg. Wagner.
1 May 66, 69p
Grant AF-EOAR-75-65
Proj. 7023
ARL-66-0137

Descriptors: (*Nitrogen compounds, Pyrolysis), (*Pyrolysis, High-pressure research), (*Dissociation, High-pressure research), Oxides, Shock waves, Reaction kinetics, Shock tubes, Polyatomic molecules, Nuclear spins, Molecular energy levels, West Germany, Hydrazine, Ammonia.

Identifiers: Nitrogen oxides.

Unimolecular dissociation reactions of small molecules were investigated. The thermal decomposition of N2O was investigated in a detailed way. By using the methods of shock waves and adiabatic compression the reaction was studied between 1200 and 2500K. All experimental results which describe a variation of the low pressure limiting rate of about eleven orders of magnitude, are in good agreement. This example and others were selected for a detailed theoretical analysis of unimolecular reactions of three- and four-atomic molecules. For shock tube experiments up to about 1000 atmospheres, a shock tube with 70 mm internal diameter was constructed and put into operation. Driving pressures up to about 200 atmospheres were used for experiments on N2O- and N2H4- decomposition, which gave data on the high pressure limiting rate of both dissociations.

AD-637 122 **Field 7D, 20D**
CFSTI Prices: HC$1.00 MF$0.50
Yale Univ., New Haven, Conn. Dept. of Engineering and Applied Science.
SHOCK WAVES WITH CHEMICAL REACTIONS IN SHOCK TUBES.
by Igor J. Eberstein. Jul 66, 23p
Contract Nonr-609 (46)
Rept. no. 4 on Experimental and Analytical Study of Nonequilibrium Flow Phenomena.

Descriptors: (*Shock waves, *Chemical reactions), Reaction kinetics, Shock tubes, Numerical analysis, Nitrogen compounds, Oxides, Nitrogen, Chemical equilibrium, Relaxation time, Adsorption spectrum, Dissociation.

Identifiers: Defender project, Nitrogen oxides.

The purpose of the paper is to present a convenient method of calculation for use with chemical kinetics studies in shock tubes. In particular, a system is discussed which may directly be applied to the mixture of nitrogen tetroxide, dioxide and nitrogen under investigation. The treatment is divided as follows: (1) shock and equilibrium Hugoniot calculations are presented; (2) calculated conditions for the shock tube are compared with those experimentally determined; (3) conditions in the chemical relaxation zone are calculated assuming a known reaction rate law; (4) a method for direct calculation of rate constants from the absorption traces is presented.

IS-1355 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Iowa State Univ. of Science and Tech., Ames.
PARTIAL MOLAL HEAT CAPACITIES OF SOME AQUEOUS RARE-EARTH CHLORIDE SOLUTIONS AT 25 DEG C.
by K. C. Jones, and F. H. Spedding. Nov 65, 85p
Contract W-7405-eng-82

Descriptors: (*Rare earth compounds, Thermochemistry), (*Thermochemistry, Rare earth compounds).

For abstract, see N 20 16.

N66-10599 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
WATER SOLUBILITY IN MOLTEN ALKALI NITRATES.
by G. Bertozzi. Aug 65, 13p
EUR-2495.E

Descriptors: *Alkali, *Nitrate, *Solubility, *Water vapor.

N66-10940 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.50
Battelle Inst., Frankfurt Am Main (West Germany).
STUDIES ON THE EFFECT OF NUCLEAR RADIATIONS ON HETEROGENEOUSLY CATALYZED GAS REACTIONS.
Aug 65, 60p
Contract EURATOM-037-62-10 RISD
EUR-2455.E

Descriptors: *Catalytic activity, *Chemical reaction, *Heterogeneity, *Nuclear radiation, *Radiation effect.

N66-11772 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
CHEMICAL REACTIVITY OF HYDROGEN, NITROGEN AND OXYGEN ATOMS AT TEMPERATURES BELOW 100 DEG K.
Semiannual technical rept. no. 5.
by D. B. Bivens, E. Kirschner, T. J. Malone, H. A. Mc Gee Jr, and J. H. Wilson. Sep 65, 29p
Grant NsG-337
NASA-CR-67975

Descriptors: *Chemical reaction, *Cryogenic temperature, *Hydrogen atom, *Nitrogen atom, *Oxygen atom.

N66-11795 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Soreq Research Establishment, Israel Atomic Energy Commission, Yavneh.
A STUDY OF THE INTERACTION BETWEEN LANTHANIDE AND NITRATE IONS.
by I. Abrahamer, I. Eliezer, and Y. Marcus. Feb 65, 16p IA-1014

Descriptors: *Nitrate, *Lanthanide.

N66-11805 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
VACUUM EMISSION DIFFUSION STUDIES OF A MOLYBDENUM EMITTER HEATED BY A URANIUM COMPOUND.
by J. Bondansky, and H. E. J. Schins. 1964, 19p
EUR-2155.E

Descriptors: *Diffusion, *Molybdenum, *Emission, *Uranium compound.

N66-11862 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
SOME EXPERIMENTAL DATA ON THE INTERACTION OF KRYPTON WITH URANIUM OXIDE SURFACES.
by O. Gautsch, C. Mustacchi, and H. Wahl. Sep 65, 34p EUR-2515.E

Descriptors: *Krypton, *Uranium compound, *Surface interaction.

N66-14172 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Canadian Armament Research and Development Establishment, Valcartier (Quebec).
STABILITY OF TRICALCIUM PHOSPHATE USED AS ANTI-CAKING AGENT WITH AMMONIUM PERCHLORATE.
by R. Voyzelle. Sep 65, 13p CARDE-TN-1674/65

Descriptors: *Ammonium perchlorate, *Calcium phosphate.

N66-14662 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
AN AUTOMATIC CONTROL SYSTEM FOR ANODIC OXIDATION PROCESSES.
by D. A. S. Walker. Sep 65, 18p AECL-2502, CRC-1223

Descriptors: *Anode, *Automatic control, *Oxidation.

N66-15619 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Department of Atomic Energy, Bombay (India).
SPECTROPHOTOMETRIC DETERMINATION OF URANIUM WITH 8-HYDROXYQUINOLINE IN ACETONE-PYRIDINE MEDIUM.
by K. B. Gajankush, and K. S. Koppiker. 1965, 22p AEET-225

Descriptors: *Uranium, *Spectrophotometry.

N66-16191 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Arizona Univ., Tucson. Dept. of Physics.
MEAN LIVES OF SOME STATES IN ATOMIC HYDROGEN.
by D. J. Donahue, and A. S. Goodman. 1965, 20p

Grant NsG-628
NASA-CR-69896

Descriptors: *Excited state, *Life, *Hydrogen.

N66-16700 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Arizona Univ., Tucson. Graduate Coll.
A MEASUREMENT OF LIFETIMES OF EXCITED STATES OF IONIZED NITROGEN ATOMS.
Master's thesis.
by G. N. McIntire. 1966, 50p
Grant NsG-628
NASA-CR-70042

Descriptors: *Decay rate, *Lifetime, *Nitrogen atom, *Excited state, *Ionized gas.

N66-16702 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Arizona Univ., Tucson. Graduate Coll.
WAVELENGTHS OF ELECTRONIC TRANSITIONS IN FOIL-EXCITED BEAMS OF LIGHT ELEMENTS.
Master's thesis.
by D. Fink. 1966, 68p
Grant NsG-628
NASA-CR-70036

Descriptors: *Atomic excitation, *Electron transition, *Particle beam, *Spectorscopy, *Wavelength, *Light element, *Spectral analysis.

N66-16983 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Pennsylvania Univ., Philadelphia. Electrochemistry Lab.
STUDIES IN FUNDAMENTAL CHEMISTRY OF FUEL CELL REACTIONS.
Quarterly progress rept., 1 Jul-30 Sep 65.
by J. O. Bockris. 1965, 61p Rept. no. 6
Grant NsG-325
NASA-CR-70205

Descriptors: *Chemical kinetics, *Electrode, *Liquid-solid interface, *Catalytic activity, *Electrochemistry, *Fuel cell.

PB-170 397 Field 7D
CFSTI Prices: HC$6.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
THE MACROSCOPIC APPROACH TO RECIPROCAL RELATIONS IN IRREVERSIBLE THERMODYNAMICS.
by Frank C. Andrews. 29 Apr 66, 18p WIS-TCI-169
Grant NSF-G-20725
Prepared for presentation at the A.I.Ch.E. Meeting, Philadelphia, December 1965.

Descriptors: (*Thermochemistry, Irreversible processes), Theory.

The validity of the Onsager-Casimir reciprocal relations is reviewed within the theoretical framework of macroscopic nonequilibrium thermodynamics. The evidence indicates that reciprocal relations can be established convincingly only by either experiment or appeal to a microscopic theory. (Author)

SC-R-66-885 Field 7D, 20H
CFSTI Prices: HC$3.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
REACTION RATES FOR HIGH-TEMPERATURE AIR.
by Mina L. Carnicom. May 66, 53p
Contract AT (29-1)-789

Descriptors: (*Air, High-temperature research), (*Thermodynamics, Charged particles).

For abstract, see N 20 16.

AD-636 360 See Field 20J

AD-636 373 See Field 20L

AD-636 374 See Field 20L

AD-636 378 See Field 7B

AD-636 388 See Field 20C

AD-636 424 See Field 12A

AD-636 479 See Field 20L

AD-636 483 See Field 10B

AD-636 499 See Field 20F

AD-636 506 See Field 10B

AD-636 522 See Field 20D

AD-636 523 See Field 20D

AD-636 548 See Field 20J

AD-636 567 See Field 20J

AD-636 614 See Field 20L

AD-636 704 See Field 20J

AD-636 717 See Field 14B

AD-636 783 See Field 7C

AD-636 808 See Field 11B

AD-636 982 See Field 4A

AD-636 983 See Field 4A

AD-637 004 See Field 4A

AD-637 079 See Field 7C

AD-637 084 See Field 7E

AD-637 085 See Field 7E

AD-637 086 See Field 7E

7E. RADIO AND RADIATION CHEMISTRY

AD-636 681 Field 7E
CFSTI Prices: HC$1.10 MF$0.50
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
THE PHOTOCHEMICAL EVOLUTION OF OXYGEN.
Final rept. 1 Jul-30 Sep 62.
by Gabriel Stein. 30 Sep 62, 7p
Contract AF 61 (052)-563

Descriptors: (*Oxygen, *Photochemistry), (*Hydrogen peroxide, Photolysis), (*Water, Decomposition), Iron compounds, Catalysis, Reaction kinetics, Ultraviolet radiation, Israel.

A summary is given of work involving (1) the evolution of oxygen in the ferric ion catalysis action of hydrogen peroxide, and (2) the decomposition of pure water at 1850A. A brief report is also included concerning visits of the author to various laboratories in Europe.

AD-636 685 Field 7E
CFSTI Prices: HC$1.60 MF$0.50
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
THE NATURE OF THE OXIDATION REDUCTION STEP IN THE CATALYTIC DECOMPOSITION OF HYDROGEN PEROXIDE BY FERRIC IONS.
Technical note.
by G. Stein, M. L. Kremer, U. Sokolov, and I. Burak. 30 Sep 62, 15p TN-1
Contract AF 61 (052)-563
Rept. on the Photochemical Evolution of Oxygen.

Descriptors: (*Oxygen, *Photochemistry), (*Hydrogen peroxide, Photolysis), Iron compounds, Catalysis, Oxidation-reduction reactions, Chemical equilibrium, Concentration (Chemistry), Free radicals, Israel.

The mechanism of the Fe3 + ion catalyzed oxygen evolution from H2O2 was investigated. The reaction proceeds through two intermediates. Oxygen is evolved by the reduction of the second intermediate FeO3 + by H2O2 in the fourth step of the mechanism. Free radicals are not formed as transient products of this step. Thus both O2 and the catalyst are liberated in it. The constant K-4 is proportional to the inverse of H (+) concentration. It was concluded that HO2 (-) is the reactive species and the reduction consists of a transfer of H (-) ions. (Author)

AD-636 686 Field 7E
CFSTI Prices: HC$1.10 MF$0.50
Hebrew Univ. Jerusalem (Israel). Dept. of Physical Chemistry.
ON THE INTERMEDIATE STEP IN THE CATALYTIC DECOMPOSITION OF HYDROGEN PEROXIDE BY FERRIC IONS.
Technical note.
by G. Stein, M. L. Kremer, U. Sokolov, and I. Burak. 30 Sep 62, 10p TN-2
Contract AF 61 (052)-563
See also AD-636 685, Rept. on the Photochemical Evolution of Oxygen.

Descriptors: (*Oxygen, *Photochemistry), (*Hydrogen peroxide, Photolysis), Iron compounds, Catalysis, Complex compounds, Reaction kinetics, Israel.

The catalytic decomposition of H2O2 by Fe (3+) ions was studied in solutions containing of the order of 1 M H2O2. The results show agreement with the mechanism involving intermediate complexes between ferric ion and the peroxide anion and permit the evaluation of K-3 = 63/min. (Author)

AD-636 687 Field 7E
CFSTI Prices: HC$1.00 MF$0.50
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
THE PHOTOLYSIS OF LIQUID WATER AT 1470A.
Interim scientific rept. no. 2.
by Uriel Sokolov, and Gabriel Stein. 10 Aug 65, 22p
Contract AF 61 (052)-655
Rept. on The Photochemical Evolution of Oxygen.

Descriptors: (*Oxygen, *Photochemistry), (*Water, Photolysis), Ultraviolet radiation, Methanols, Ethanols, Quantum statistics, Reaction kinetics, Heavy water, Israel.

Identifiers: Quantum yield.

The photolysis of water and of dilute aqueous solutions of O2, methanol ethanol and isopropanol was studied at 1470A. The results are consistent with the reaction scheme: H2O = H2O* to (H+OH) to H2O. The limiting quantum yield for the formation of the geminate radical pair is 0.7 plus or minus 0.1 at room temperature. Scavengers compete in an inhomogeneous kinetics with geminate recombination. The direct formation of molecular products other than by radical mechanisms is excluded. Results on D2O solutions of ethanol support the conclusions. The evidence does not favour direct interaction of scavengers with the excited water molecules H2O*. (Author)

AD-636 689 Field 7E
CFSTI Prices: HC$2.00 MF$0.50
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
THE PHOTOCHEMICAL EVOLUTION OF OXYGEN.
Final scientific rept. for 1962-1965.
by G. Stein. 30 Sep 65, 36p
Contract AF 61 (052)-655

Descriptors: (*Oxygen, *Photochemistry), (*Water, Photolysis), (*Hydrogen peroxide, Photolysis), Solutions, Excitation, Catalysts, Iron compounds, Ultraviolet radiation, Gas analysis, Electrolytic cells, Reaction kinetics, Chemical bonds, Complex compounds, Free radicals, Israel.

The aim of the work was to contribute to an understanding of the basic photochemical processes which lead to the evolution of oxygen from aqueous solutions. The research was divided into three parts: (1) the photochemistry of pure liquid water, when water itself absorbs the light below 2000A; (2) the evolution of oxygen from aqueous solutions of hydrogen peroxide under the influence of ferric ion catalysts (hydrogen peroxide is the halfway stage in the 4 electron equivalent change from water to molecular oxygen); (3) the photochemical evolution of oxygen from solutions containing ferric ions and hydrogen peroxide under the influence of light.

AD-637 084 Field 7E, 7D
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
THE PROMOTING EFFECT OF CUPRIC IONS ON THE FERRIC ION CATALYZED DECOMPOSITION OF HYDROGEN PEROXIDE.
by Mordechai L. Kremer. 5 Jan 62, 5p
Contract AF 61 (052)-563

Descriptors: (*Oxygen, *Photochemistry), (*Hydrogen peroxide, Photolysis), (*Copper, Catalysis), Decomposition, Catalysts, Iron compounds, Reaction kinetics, Complex compounds, Israel.

The effect of Cu (2+) ions on the Fe (2+) ion catalyzed decomposition of H2O2 was reinvestigated. Deviations from steady state, first order kinetics were observed at a higher H2O2 concentration in the presence of Cu (2+) ions. The results are discussed in terms of the mechanism suggested by Kremer and Stein for the catalytic decomposition of H2O2. The promoting action of Cu (2+) is due to its acceleration of the conversion of the primary to the secondary iron (III)-H2O2 complex. (Author)

AD-637 085 **Field 7E, 7D, 6A**
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
CATALYTIC ACTIVITY OF HAEMIN ON THE DECOMPOSITION OF HYDROGEN PEROXIDE.
by M. L. Kremer. 1962, 3p
Contract AF 61 (052)-655

Descriptors: (*Oxygen, *Photochemistry), (*Hydrogen peroxide, Photolysis), (*Proteins (Conjugated), Catalysis), Iron compounds, Hemoglobin, Catalase, Catalysts, Reaction kinetics, Molecular orbitals, Israel, Decomposition.

Identifiers: Hemins.

For abstract, see T 66 18.

AD-637 086 **Field 7E, 7D**
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
OXIDATION REDUCTION STEP IN CATALYTIC DECOMPOSITION HYDROGEN PEROXIDE BY FERRIC IONS.
by Mordechai L. Kremer. 21 Dec 62, 8p
Contract AF 61 (052)-655

Descriptors: (*Oxygen, Photochemistry), (*Hydrogen peroxide, Photolysis), (*Oxidation-reduction reactions, Catalysis), Decomposition, Iron compounds, Catalysts, Reaction kinetics, Free radicals, Ions, Israel.

The mechanism of the Fe (3+)-ion-catalyzed oxygen evolution from H2O2 was investigated. The reaction proceeds through two intermediates. Oxygen is evolved by the reduction of the second intermediate FeO (3+) by H2O2. Both O2 and the catalyst are liberated in this process, probably without the intermediate formation of free radicals. The rate constant of this step is proportional to the inverse of H (+) concentration. It was concluded that HO2 (-) is the reactive form of H2O2 and that the reduction consists of a transfer of H (-) ions. (Author)

AD-637 099 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ANALYSIS OF THE NUCLEAR MAGNETIC RESONANCE OF THE SPECTRA OF THE ABC THREE-SPIN SYSTEM II. THE RESONANCE SPECTRUM OF ACRYLONITRILE.
by Xiao-Tian Liang. 9 May 66, 8p FTD-TT-65-1172
TT-66-62046
Edited trans. of Hua Hsueh Hsueh Pao (Chinese People's Republic) v30 n4 p429-31 1964.

Descriptors: (*Nuclear magnetic resonance, *Acrylonitriles), Nuclear spins, Spectroscopy, Graphics, Molecular energy levels, China.

For abstract, see T 66 18.

CONF-650652 **Field 7E, 8G, 8H, 18D K**
CFSTI Prices: HC$8.00 MF$3.25
Washington State Univ., Pullman.
RADIOCARBON AND TRITIUM DATING, JUNE 7-11, 1965.
by Roy M. Chatters, and Edwin A. Olson. 1965, 800p
Contract AT (45-1)-353
Prepared in cooperation with Whitworth Coll., Spokane, Wash. Proceedings of the Sixth International Conference Held at Washington State University, Pullman, Washington.

Descriptors: (*Tritium, Geological age determination), (*Geological age determination, Symposia).

For abstract, see N 20 16.

LA-1721-2nd-Ed. **Field 7E**
CFSTI Prices: HC$5.00 MF$0.50
Los Alamos Scientific Lab., N. Mex.
COLLECTED RADIOCHEMICAL PROCEDURES (RADIOCHEMISTRY GROUP J-11).
4 Apr 66, 54p
Contract W-7405-eng-36

Descriptors: (*Radiochemistry, Chemical compounds), (*Chemical compounds, Atomic properties).

For abstract, see N 20 16.

N66-13039 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Junta de Energia Nuclear, Madrid (Spain). Seccion de Radioquimica.
PREPARATION OF HIGH SPECIFIC ACTIVITY OF 51 CR BY THE SZILARD-CHALMERS EFFECT ON POTASSIUM CHROMATE.
by M. A. V. Castejon, and M. B. Gomez. 1965, 14p JEN-144-DQ/1-45

Descriptors: *Irradiation, *Radioactive isotope, *Chromium, *Potassium chromate.

N66-16023 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.m.b.H., Seibersdorf (Austria). Reaktorzentrum.
60 C O-GAMMA RAYS INDUCED CARBOXYLATION OF METHYLAMINE.
by L. R. De La Paz, and N. Getoff. 1965, 19p SGAE-CH-21/1965

Descriptors: *Cobalt 60, *Methyl, *Amine, *Gamma radiation.

RMO-3001-Rev-1-Suppl **Field 7E**
CFSTI Prices: HC$3.00 MF$0.75
Pitkin (Lucius) Inc., Grand Junction, Colo. Western Uranium Project.
HANDBOOK OF ANALYTICAL PROCEDURES. SUPPLEMENT TO RMO-3001, REV. NO. 1.
by W. E. Bush, and L. J. Higgins. 17 Jun 65, 95p
Contract AT (05-1)-912

Descriptors: (*Radiochemistry, Uranium), (*Rock (Geology), Ores (Metal sources)).

AD-636 333 **See Field 6A**

AD-636 336 **See Field 6A**

AD-636 450 **See Field 7D**

AD-636 736 **See Field 7D**

AD-636 958 **See Field 18L**

NYO-3160-1 **See Field 18B**

8. EARTH SCIENCES AND OCEANOGRAPHY

PB-172 783 **ield 8, 8I, 8**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS WICHITA COUNTY.
1950-58, 3p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 783 **See Field 8I**

8A. BIOLOGICAL OCEANOGRAPHY

AD-636 412 **Field 8A, 11E, 11F, 11I K**
CFSTI Prices: HC$3.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART IV. ONE YEAR AT 6,800 FEET.
Technical rept. Mar 64-Mar 66.
by James S. Muraoka. Jun 66, 51p TR-R-456
Proj. Y-R011-01-01-042
See also AD-631 078.

Descriptors: (*Fouling, Materials), (*Marine biology, Fouling), (*Materials, Degradation), Fungus deterioration, Oceanographic data, Sedimentation, Rock (Geology), Metals, Glass, Cotton, Wood, Plastics, Cordage, Rubber, Butyl rubber, Coatings, Moisture, Absorption, Bacteria, Marine borers, Mollusca, Laminated plastics, Fibers (Natural), Electric insulation, Voltage, Test methods, Pacific Ocean.

The report covers the data obtained after exposing metallic and nonmetallic specimens for 13 months on the floor of the Pacific Ocean at a depth of 6,800 feet (Test Site 1). The specimens were attached to a Submersible Test Unit that was retrieved in February 1965. Preliminary examination of the specimens was made aboard ship, and the final examination, tests and analyses were performed at the Naval Civil Engineering Laboratory. On recovery, most of the plastic materials and all of the rope specimens were covered with bacterial slime. Cotton and manila rope specimens were severely deteriorated by marine microorganisms. Wooden test panels, plastics, and manila ropes were attacked by molluscan borers. Glass, metals, natural and butyl rubber, and certain plastic materials were not adversely affected. The results of breaking-strength tests on ropes, weight loss measurements of wood panels, moisture absorption tests on plastics, and insulation resistance and voltage breakdown tests on electrical insulating materials are presented. (Author)

AD-636 491 **Field 8A, 6C**
University of Southern California, Los Angeles. Dept. of Biological Sciences.
SIZE VARIATION IN METRIDIA LONGA (LUBBOCK).
by Stephen R. Geiger. 1966, 7p
Contract Nonr-228 (19)
Proj. NR-307-270

Descriptors: (*Crustacea, *Arctic Ocean), (*Plankton, Arctic Ocean), Marine biology, Samplers, Submarines, Oceanographic data, Ecology.

Identifiers: Metridia Longa (Lubbock).

A nuclear powered submarine permitted the plankton under a large ice covered area to be sampled in a brief period. These samples have been used to demonstrate size variation in the copepod Metridia longa (Lubbock) from different areas. Differences between and within water masses are related to these variations in size. (Author)

AD-636 755 **Field 8A**
American Inst. of Biological Sciences, Washington, D. C.
MARINE BIOLOGY. VOLUME II.
by Carl H. Oppenheimer. 24 Oct 62, 362p
Prepared for presentation at the International Interdisciplinary Conference (2nd), Princeton, New Jersey, October 21-24, 1962.

Descriptors: (*Marine biology, Symposia), Plankton, Nutrition, Sampling, Periodic variations, Life cycle, Ecology, In vitro analysis, In vivo analysis, Morphology (Biology).

Contents: Natural phytoplankton societies; Synecological problems; Integrative in vivo and in vitro aspects.

AD-636 764 Field 8A
American Inst. of Biological Sciences, Washington, D. C.
MARINE BIOLOGY. VOLUME III.
by W. T. Edmondson. 22 Jan 64, 313p
Prepared for presentation at International Interdisciplinary Conference (3rd), Princeton, New Jersey, January 19-22, 1964.

Descriptors: (*Marine biology, Symposia), Sampling, Nutrition, Food, Reproduction (Physiology), Periodic variations, Diet, Algae, Plankton, Ocean bottom.

Contents: Sampling organisms and related problems; Feeding: The quality of food; Seasonal aspects of food relationships and breeding; Effects of quantity, quality, change of diet and nutritional value of food; Algal mutualism; Plankton; Vertical migration; Benthos.

AD-636 944 Field 8A, 14B
CFSTI Prices: HC$2.00 MF$0.50
Scripps Institution of Oceanography, La Jolla, Calif.
ISAACS-BROWN OPENING, CLOSING TRAWL.
by John D. Isaacs, and Daniel M. Brown. 27 Jul 66, 42p SIO Ref-66-18
Contract Nonr-2216 (23)

Descriptors: (*Marine biology, *Samplers), (*Nets, Marine biology), Collecting methods, Towed bodies, Porous materials, Marine engineering.

Identifiers: Isaacs-Brown O/C Trawl.

It has been apparent for some years that marine life is vertically stratified. The understanding of the importance and nature of the animal distribution both vertically and horizontally is essential in the studies of fisheries, engineering, and acoustics. Large opening and closing nets are necessary in the understanding of this distribution. The Isaacs-Kidd Midwater Trawl is one of the more widely used and effective big nets around, and so a means was devised that would convert this proven net into an opening and closing one and by so doing would add an extremely useful tool to the field of marine biology. The Isaacs-Brown O/C Trawl was designed to make possible the conversion of the existing grawls, and to initiate opening by using an internal flap in the mouth of the net so that when the net was opened, an uncontaminated sample could be obtained. Field trials and tests proved the feasibility and utility of the design. (Author)

AD-636 434 See Field 8F

8B. CARTOGRAPHY

AD-636 659 Field 8B, 8C
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
METHOD FOR THE PHOTOGRAMMETRIC MAPPING OF WAVES FROM A SHIP AND A DEVICE FOR THE DEVELOPMENT OF PHOTOS OBTAINED BY THIS NEW METHOD.
by N. V. Khokhlovskii, V. A. Dubovich, A. V. Tsarev, V. I. Gorshkov, and A. P. Sheremet. 21 Mar 66, 6p FTD-TT-65-2028
Unedited rough draft trans. of Patent (USSR) 159 297, appl. 810524/26-10, 19 May 64.

Descriptors: (*Ocean waves, *Photogrammetry), Stereoscopic photography, Hydrographic surveying, Oceanology, USSR.

The proposed method makes it possible to obtain photos during normal mapping and with a horizontal position of the optical axis of the camera by closing the contacts of an electrical circuit using a gyro-vertical at the moment of zero value for the bank angle. This provides the possibility of developing the photos in portable devices under expedition conditions. In order to hasten the execution of readings the increased coordinate for the following calculation of height and wave lengths and increasing of the accuracy of these calculations in the proposed device, a needle indicator is mounted on the longitudinal carriage. In addition, in order to directly obtain profiles of waves with respect to the vertical planes parallel to the photography base a pantograph is rigidly mounted with the longitudinal carriage and is displaced from the transverse carriage. (Author)

AD-636 847 Field 8B, 9B
CFSTI Prices: HC$3.00 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
A FORTRAN PROGRAM FOR GRID CALIBRATION.
Memorandum rept.
by A. Roberta Wooten. Apr 66, 88p BRL-MR-1742
Proj. RDT/E-1L013001A91A
Addendum to Memorandum rept. no. 1600.

Descriptors: (*Programming (Computers), *Mapping), Comparators, Calibration, Programming languages, Digital computers.

Identifiers: FORTRAN.

This report is an addendum to 'A Forast Program for Stereocomparator Grid Calibration and Comparator Calibration' BRL Memorandum Report No. 1600, by A. Roberta Wooten. The grid calibration phase of the above report is programmed in Fortran language to make the program accessible to agencies using Fortran language on commercial electronic computers. (Author)

8C. DYNAMIC OCEANOGRAPHY

AD-636 771 Field 8C, 20D, 9B
CFSTI Prices: HC$3.00 MF$0.75
Virginia Inst. of Marine Science, Gloucester Point.
A METHOD FOR CALCULATING AND PLOTTING SURFACE WAVE RAYS.
Technical memo.
by W. Stanley Wilson. Feb 66, 64p TM-17
Contract DA-49-055-CIVENG-64-5

Descriptors: (*Ocean waves, Hydrodynamics), (*Hydrodynamics, *Programming (Computers)), Oceanology, Seacoast, Virginia.

A method using a digital computer and an incremental plotter for calculating and plotting wave rays is described. Given a grid of depth values, the initial position of a wave ray, and the direction of travel and the period of the wave, successive points along the ray path are calculated. For each point on the path, water depth and bottom slope are estimated from the depth grid by linear interpolation, wave speed and curvature are computed according to classic theory, and the location of the next successive point is approximated by an iteration procedure. The numerical results may be plotted automatically. An example of the results, obtained from an application of the method to Virginia Beach, Virginia, is presented. Unless the bathymetry of an area is unusually smooth, this method calculates and plots wave rays faster than they can be manually constructed. (Author)

AD-636 659 See Field 8B

AD-636 810 See Field 13B

AD-636 932 See Field 8J

AD-636 987 See Field 8J

8D. GEOCHEMISTRY

AD-636 674 See Field 14B

8E. GEODESY

AD-636 587 Field 8E, 22C, 17B
CFSTI Prices: HC$1.00 MF$0.50
Naval Weapons Lab., Dahlgren, Va.
SITE COORDINATES BASED ON DOPPLER SATELLITE TRACKING COMPARED WITH SOUTHEAST U. S. SURVEY (SEUSS) BY GEODIMETER.
by Robert W. Hill. Jul 66, 25p NWL-2048

Descriptors: (*Satellite tracking systems, Doppler systems), (*Astronomical geodesics, Satellite tracking systems), Tracking, Position finding, Geodesics, Naval research.

Identifiers: SEUSS.

The use of Doppler satellite data as a geodetic tool for determining the coordinates of mobile tracking vans is discussed. Results are given for four sites in the Southeastern United States. Comparisons are made with geodimeter survey for the same sites. Agreement of better than 4 meters with the survey is demonstrated for a single station using the short arc process, and better than 10 meters n relative positions of the three SEUSS stations using the long arc process. (Author)

N66-14217 Field 8E
CFSTI Prices: HC$5.00 MF$1.00
Defence Research Telecommunications Establishment, Ottawa (Ontario).
ALOUETTE II - ALOSYN IONOSPHERIC DATA, 1 AUGUST TO 15 AUGUST 1963.
1963, 166p

Descriptors: *Alouette I satellite, *Ionosphere, *Geophysical satellite.

For abstract, see T 66 18.

N66-14259 Field 8E
CFSTI Prices: HC$2.00 MF$0.50
Kiruna Geophysical Observatory (Sweden).
KIRUNA GEOPHYSICAL DATA, JANUARY-MARCH 1965.
by W. Riedler. 1965, 48p Rept. 65/1

Descriptors: *Ionospheric absorption, *Table, *Upper atmosphere, *Earth current, *Geophysics, *Polar region.

N66-14260 Field 8E
CFSTI Prices: HC$2.00 MF$0.50
Kiruna Geophysical Observatory (Sweden).
KIRUNA GEOPHYSICAL DATA, APRIL-JUNE 1965.
by W. Riedler. 1965, 33p Rept. 65/2

Descriptors: *Ionospheric absorption, *Table, *Upper atmosphere, *Earth current, *Geophysics, *Polar region.

N66-14267 Field 8E
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE MEASUREMENT OF THE EARTH'S INFRARED RADIATION FROM A SKYLARK ROCKET.
by J. K. Moore. Aug 65, 40p RAE-TR-65166

Descriptors: *Earth radiation, *Infrared radition, *Skylark rocket.

N66-15909 Field 8E
CFSTI Prices: HC$1.00 MF$0.50
Tokyo Astronomical Observatory (Japan).
DATA OF TIME OBSERVATION AND VARIATION OF THE ROTATION SPEED OF THE EARTH.
by S. Fujii, S. Okazaki, and M. Torao. 31 Mar 65, 15p Bull. no. 169

Descriptors: *Earth rotation, *Seasonal variation, *Time measurement.

8F. GEOGRAPHY

AD-636 434 **Field 8F, 8A, 5C**
CFSTI Prices: HC$5.00 MF$1.00
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
GEOGRAPHY OF FISHING IN BRITISH HONDURAS AND ADJACENT COASTAL AREAS.
Technical rept.
by Alan K. Craig. 15 Apr 66, 153p TR-28, Contrib-66-2
Contracts Nonr-1575 (00), Nonr-1575 (03)
Proj. NR-388-002

Descriptors: (*Fishes, *Central America), Aquatic animals, Natural resources, Geography, Caribbean Sea, Social sciences.

Identifiers: British Honduras.

A small but flourishing fishing industry exists in northern British Honduras where it is an exception to the general lack of commercial fisheries along the lightly inhabited western coast of the Caribbean Sea between Cabo Catoche and Cabo Gracias a Dios. Aspects of the cultural geography of fishing are presented with emphasis on historical development and the contemporary distributions of practices established on islands adjacent to an extensive barrier reef. The inhabitants of fishing villages usually have similar racial and ethnic backgrounds but tend to adopt a single characteristic fishing method distinct from their neighbors. Evidence of a substantial aboriginal coastal population was discovered in and around several large lagoons having an environment presently unsuited for agriculture. Analysis of pertinent colonial literature indicates that few items of the aboriginal fishing cultures were adopted by early settlers, and almost none is to be found in the present inventory of equipment. Limitations have been placed on the design of boat types and progress of shipbuilding by certain physical factors, but shipbuilding continues to be conducted on an informal basis preserving many antiquated construction methods. The introduction of modern processing, transportation, and marketing facilities has stimulated development of the spiny lobster industry so that it now far exceeds in value all other marine resources combined. The exploitation of scale fish continues to remain primarily on a subsistence level. (Author)

AD-636 844 **Field 8F**
CFSTI Prices: HC$1.00 MF$0.50
National Academy of Sciences-National Research Council, Washington, D. C. Pacific Science Board.
SCIENTIFIC INVESTIGATION IN MICRONESIA.
Final rept.
by Harold J. Coolidge. Jul 66, 26p
Contracts Nonr-2300 (12), N7onr-291 (04)
Proj. NR-388-001
Contract N7onr-291 (54).

Descriptors: (*Micronesia, *Geography), Pacific Ocean Islands, Coral reefs, Ecology, Social sciences, Biology.

The program of Scientific Investigations in Micronesia, carried out between 1949 and 1966 by the Pacific Science Board of the National Academy of Sciences - National Research Council covered a wide range of scientific research projects in the Pacific Island area. The main emphasis was on the Coral Atoll Program, which used the relatively simple examples of life and features of coral atolls for the study of a tropical ecosystem. Other research, designed to furnish not only fundamental scientific knowledge of the islands but in many cases to assist the naval administrative autorities of the Trust Territory, ranged from anthropological and linguistic studies to biological, publich health, nutritional, and land utilization studies. (Author)

AD-636 962 See Field 6G
PB-169 740 See Field 5C
PB-170 906 See Field 13J
PB-170 946 See Field 5C
PB-170 947 See Field 5C
PB-170 948 See Field 5C
PB-170 950 See Field 5C
PB-170 951 See Field 5C
PB-170 953 See Field 5C
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Field 8—EARTH SCIENCES AND OCEANOGRAPHY

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PB-172 850 See Field 8G

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PB-172 853 See Field 8G

8G. GEOLOGY AND MINEROLOGY

AD-636 541 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
X-RAY DIFFRACTION ANALYSIS OF THE TUTO (GREENLAND) CLAY.
Special rept.
by D. M. Anderson, and A. R. Tice. May 66. 5p
SR-98

Descriptors: (*Clay minerals, X-ray diffraction analysis), Clay, Greenland, Petrography.

For abstract, see T 66 18.

AD-636 970 **Field 8G, 8N**
CFSTI Prices: HC$1.00 MF$0.50
Directorate of Scientific Information Services, Ottawa (Ontario).
ALTERNATING FIELD DEMAGNETIZATION STUDY ON LOWER SINIAN SANDSTONES IN XIUNING (HSIUNING) DISTRICT, ANHUI (ANHWEI) PROVINCE.
by Liu Ch'un, and Feng Hao. May 66. 13p T-7-C
TT-66-62025
Trans. from Ti Ch'iu Wu Li Hsueh Pao (Chinese People's Republic) V14 n3 p173-80 1965.

Descriptors: (*Sandstone, Magnetic properties), (*Terrestrial magnetism, *Petrology), Stratigraphy, China.

Identifiers: Paleomagnetism.

This paper presents the results of magnetic stability testing, by alternating current demagnetization, of some orientated Lower Sinian sandstone samples from the Xiuning formation in Xiuning District, Anhui Province. The results show that the natural remanent magnetization of the formation is stable, and its mean direction is determined as D sub r = 311 degrees and i sub r = 76 degrees. Thus the position of the paleomagnetic north pole in this era is inferred to be 90 degrees E and 45 degrees N, and the paleolatitude of the sampling site was 63 degrees. The paper confirms the importance of the alternating current demagnetization test for paleomagnetic research. Finally, some views are expressed on the study of the local climatic conditions during the Early Sinian period. (Author)

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Foreign Technology Div., Wright-Patterson AFB, Ohio.
TREATING TELLURIC-CURRENT GRAPHS BY THE METHOD OF TRUE ELLIPSES.
by G. N. Tkachev. 26 May 66. 15p FTD-TT-65-1902
TT-66-62036
Unedited rough draft trans. of Geologiya i Geofizika (USSR) n11 p114-21 1963.

Descriptors: (*Geophysical prospecting, Telluric currents), (*Telluric currents, Statistical analysis), Geophysics, USSR.

For abstract, see T 66 18.

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MINERALOGY OF SULFIDE NODULES IN SOME IRON METEORITES.
by F. B. Henderson III. Jun 65. 56p
Grant NsG-282
NASA-CR-69382

Descriptors: *Iron meteorite, *Mineralogy, *Sulfide.

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Harvard Univ., Cambridge, Mass. Mineralogical Museum.
CATALOGUE OF THE METEORITE COLLECTION.
Jun 65. 43p
Grant NsG-282
NASA-CR-69375

Descriptors: *Meteorite, *Weight factor.

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North American Philips Co., Inc., Briarcliff Manor, N. Y.
STUDY PROGRAM TO OBTAIN THE INFRARED ABSORPTION SPECTRA OF POWERED ROCKS.
Technical rept. no. 174 (Final).
Dec 64. 72p PL-15-FMIR64-1107
Contract NASw-964
NASA-CR-69826

Descriptors: *Absorption spectrum, *Infrared spectroscopy, *Powder, *Rock.

N66-18384 **Field 8G**
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California Inst. of Tech., Pasadena. Div. of Geological Sciences.
THE ISOTOPIC ABUNDANCE AND CONTENT OF SULFUR IN METEORITES.
by J. R. Hulston, and I. R. Kaplan. 1965. 40p
Contrib-1333
Grant NSg-347
NASA-CR-62106
Prepared in cooperation with McMaster Univ., Hamilton (Ontario).

Descriptors: *Iron meteorite, *Stony meteorite, *Isotope, *Sulfur.

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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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PB-172 663 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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CFSTI Prices: HC$2.00 MF$0.75
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PB-172 668 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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PB-172 670 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 671 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 672 **Field 8G, 8I, 8F**
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PB-172 718 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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1950-58, 3p

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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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PB-172 726 **Field 8G, 8I, 8F**
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PB-172 727 **Field 8G, 8I, 8F**
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, OKLAHOMA, OSAGE COUNTY.
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 728 **Field 8G, 8I, 8F**
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PB-172 731 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 732 **Field 8G, 8I, 8F**
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PB-172 737 **Field 8G, 8I, 8F**
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PB-172 738 **Field 8G, 8I, 8F**
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PB-172 739 **Field 8G, 8I, 8F**
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, SOUTH DAKOTA, BRULE COUNTY.
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 741 **Field 8G, 8I, 8F**
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, SOUTH DAKOTA, BUTTE COUNTY.
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 742 **Field 8G, 8I, 8F**
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, SOUTH DAKOTA, CHARLES MIX COUNTY.
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PB-172 743 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 744 **Field 8G, 8I, 8F**
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, SOUTH DAKOTA, FALL RIVER COUNTY.
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 745 **Field 8G, 8I, 8F**
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Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, SOUTH DAKOTA, HARDING COUNTY.
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 746 **Field 8G, 8I, 8F**
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PB-172 747 **Field 8G, 8I, 8F**
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, SOUTH DAKOTA, LYMAN COUNTY.
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PB-172 748 **Field 8G, 8I, 8F**
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PB-172 750 **Field 8G, 8I, 8F**
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, SOUTH DAKOTA, PERKINS COUNTY.
1950-58, 2p
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 752 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 753 **Field 8G, 8I, 8F**
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, ARCHER COUNTY.
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Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 754 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, BEXAR COUNTY.
1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 755 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.75
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, BREWSTER COUNTY.
1950-58, 30p
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 756 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, BRISCOE COUNTY.
1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 757 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, BURNET COUNTY.
1950-58, 4p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 758 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, CULBERSON COUNTY.
1950-58, 10p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 759 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, DUVAL COUNTY.
1950-58, 10p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 760 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, EDWARDS COUNTY.
1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 761 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, EL PASO COUNTY.
1950-58, 5p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 762 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, FAYETTE COUNTY.
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 763 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, GILLESPIE COUNTY.
1950-58, 3p
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 764 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, TEXAS, GONZALES COUNTY.
1950-58, 2p
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 765 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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PB-172 784 **Field 8G, 8I, 8F**
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PB-172 785 **Field 8G, 8I, 8F**
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PB-172 786 **Field 8G, 8I, 8F**
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PB-172 791 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

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PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, UTAH, SAN JUAN COUNTY.
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PB-172 802 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 803 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 804 **Field 8G, 8I, 8F**
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PB-172 805 **Field 8G, 8I, 8F**
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PB-172 806 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.50
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Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 807 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 808 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
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PB-172 809 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 810 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 811 **Field 8G, 8I, 8F**
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 812 **Field 8G, 8I, 8F**
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1950-58, 25p
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Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 813 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, VIRGINIA.
1950-58, 35p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 814 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, CHELAN COUNTY.
1950-58, 9p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 815 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, CLALLAM COUNTY.
1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 816 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, FERRY COUNTY.
1950-58, 47p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 817 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, KING COUNTY.
1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 818 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, KITSAP COUNTY.
1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 819 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, KITTITAS COUNTY.
1950-58, 3p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 820 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, LEWIS COUNTY.
1950-58, 4p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 821 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, LINCOLN COUNTY.
1950-58, 7p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 822 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, OKANOGAN COUNTY.
1950-58, 26p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 823 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, PEND OREILLE COUNTY.
1950-58, 36p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 824 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, PIERCE COUNTY.
1950-58, 2p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 825 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, SNOHOMISH COUNTY.
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Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 826 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, SPOKANE COUNTY.
1950-58, 32p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 827 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, STEVENS COUNTY.
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Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 828 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WASHINGTON, YAKIMA COUNTY.
1950-58, 5p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 829 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WEST VIRGINIA.
1950-58, 3p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 830 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WISCONSIN.
1950-58, 3p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 831 **Field 8G, 8I, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, ALBANY COUNTY.
1950-58, 57p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 832 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, BIG HORN COUNTY.
1950-58, 28p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 833 **Field 8G, 8I, 8F**
CFSTI Prices: HC$3.00 MF$1.00
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, CAMPBELL COUNTY.
1950-58, 98p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 835 **Field 8G, 8I, 8F**
CFSTI Prices: HC$3.00 MF$1.00
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, CONVERSE COUNTY.
1950-58, 88p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 836 **Field 8G, 8I, 8F**
CFSTI Price: MF$1.00
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, CROOK COUNTY.
1950-58, 68p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 837 **Field 8G, 8I, 8F**
CFSTI Prices: HC$7.00 MF$3.25
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, FREMONT COUNTY.
1950-58, 380p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 838 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, GOSHEN COUNTY.
1950-58, 7p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 839 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, HOT SPRINGS COUNTY.
1950-58, 4p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 840 **Field 8G, 8I, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, JOHNSON COUNTY.
1950-58, 53p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 841 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, LARAMIE COUNTY.
1950-58, 4p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 842 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, LINCOLN COUNTY.
1950-58, 8p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 843 **Field 8G, 8I, 8F**
CFSTI Prices: HC$3.00 MF$1.00
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, NATRONA COUNTY.
1950-58, 98p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 844 **Field 8G, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.75
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, NIOBRARA COUNTY.
1950-58, 48p
repared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 845 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, PARK COUNTY.
1950-58, 16p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington nd New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 846 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, PLATTE COUNTY.
1950-58, 7p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 847 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, SHERIDAN COUNTY.
1950-58, 3p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 848 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, SUBLETTE COUNTY.
1950-58, 15p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 849 **Field 8G, 8I, 8F**
CFSTI Prices: HC$4.00 MF$1.25
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, SWEETWATER COUNTY.
1950-58, 115p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 850 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, TETON COUNTY.
1950-58, 8p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 851 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, UINTA COUNTY.
1950-58, 4p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 852 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, WASHAKIE COUNTY.
1950-58, 6p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), *Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

PB-172 853 **Field 8G, 8I, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
PRELIMINARY RECONNAISSANCE REPORTS ON REPORTED OCCURRENCES OF URANIUM DEPOSITS, WYOMING, WESTON COUNTY.
1950-58, 9p
Prepared for the AEC by Geological Survey, Bureau of Mines and/or Grand Junction, Washington and New York AEC Offices.

Descriptors: (*Geology, Uranium), (*Uranium, Geophysical prospecting), Economic geology, Mining engineering, Petrology, Minerals, Radioactivity.

AD-636 726 **See Field 8K**

AD-636 932 **See Field 8J**

AD-636 967 **See Field 8K**

CONF-650652 **See Field 7E**

8H. HYDROLOGY AND LIMNOLOGY

PB-170 375 **Field 8H, 6F**
CFSTI Price: MF$0.50
Bureau of Reclamation, Denver, Colo.
AQUATIC WEED CONTROL STUDIES.
Water resources technical publication.
by N. E. Otto, and T. R. Bartley. 1966, 50p
Research rept. RR-2
Availability: Available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.35.

Descriptors: (*Herbicides, Effectiveness), (*Algae, Herbicides), Plants (Botany), Lakes, Acroleins, Growth, Stability, Colloids, Toxicity, Morphology (Biology), Ecology, Irrigation systems, Water supplies, Soils, Vinyl plastics, Test facilities.

Identifiers: Aquatic plants.

Progress of various Bureau of Reclamation laboratory studies concerned with submersed aquatic weed problems are covered. Results summarized are not considered conclusive and generally require further investigation. Low-rate, long contract period treatments with acrolein in a flowing water situation caused a significant reduction in the total plant dry weight and vegetative propagule production of pondweeds. Weekly injury and regrowth estimates for 4 weeks following acrolein treatments describe the trends of pondweed response to the acrolein treatments. Results of recent herbicidal evaluation tests did not reveal any compound of promise for aquatic weed control. Two formulations of endothal exhibited good algaecidal activity on filamentous green algae in laboratory tests. The phytotoxicity of xylene-type aquatic herbicides was not enhanced by the use of selected additives. Greenhouse tests show that the herbicidal activity of xylene was reduced when emulsifier concentrations of less than 1.0 percent, volume to volume, were used. Techniques for repeated sampling of soil-water in fixed sites of aquatic soils and subsequent microanalyses for dissolved oxygen and alkalinity were evaluated and found suitable. Exploratory studies on the location and extent of subterranean sago pondweed tuber growth in culture aquaria did not appear to bear any relationship to soil type or dissolved oxygen content and alkalinity of interstitial soil-water. Silvex acid coated with vinyl resin was superior to the uncoated acid in total number of crops of sago pondweed killed at the higher rates of soil application. (Author)

CONF-650652 **See Field 7E**

8I. MINING ENGINEERING

N66-16686 **Field 8I**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Mines, Minneapolis, Minn. Twin Cities Mining Research Center.
MULTIDISCIPLINARY RESEARCH LEADING TO UTILIZATION OF EXTRATERRESTRIAL RESOURCES.
Quarterly status rept, 1 Oct 65 - 1 Jan 66.
by T. C. Atchison. 1966, 14p
Contract NASA-Order-R-09
NASA-CR-70041

Descriptors: *Mineral, *Mining, *Extraterrestrial matter.

PB-172 475 **See Field 8G**

PB-172 476 **See Field 8G**

PB-172 477 **See Field 8G**

PB-172 478 **See Field 8G**

PB-172 479 **See Field 8G**

PB-172 480 **See Field 8G**

PB-172 481 **See Field 8G**

PB-172 482 **See Field 8G**

PB-172 483 **See Field 8G**

PB-172 484 **See Field 8G**

PB-172 485 **See Field 8G**

PB-172 486 **See Field 8G**

PB-172 487 **See Field 8G**

PB-172 488 **See Field 8G**

PB-172 489 **See Field 8G**

PB-172 490 **See Field 8G**

PB-172 491 **See Field 8G**

PB-172 492 **See Field 8G**

PB-172 493 **See Field 8G**

Field 8—EARTH SCIENCES AND OCEANOGRAPHY

PB-172 494 See Field 8G
PB-172 495 See Field 8G
PB-172 496 See Field 8G
PB-172 497 See Field 8G
PB-172 498 See Field 8G
PB-172 499 See Field 8G
PB-172 500 See Field 8G
PB-172 501 See Field 8G
PB-172 502 See Field 8G
PB-172 503 See Field 8G
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8J. PHYSICAL OCEANOGRAPHY

AD-636 496 **Field 8J, 10B, 20M**
CFSTI Prices: HC$3.00 MF$0.75
Naval Ordnance Test Station, China Lake, Calif.
UNDERSEA GEOTHERMAL DEPOSITS, THEIR SELECTION AND POTENTIAL USE.
Research rept.
by C. F. Austin. Jul 66, 76p NOTS-TP-4122
Task R360-FR106/216-1/RO11-01-01

Descriptors: (*Marine geophysics, *Steam power plants), Marine geology, Thermodynamics, Steam, Geochemistry, Energy conversion, Power supplies.

Identifiers: Geothermal deposits.

Geothermal deposits beneath the ocean floor appear to be the principal indigenous energy source available to installations in the deep-sea environment and are the only apparent alternative indigenous power source to fossil fuels in the continental shelf and slope environment. This study presents a review of geothermal deposits from four points of view: (1) locating potential geothermal deposits at or near which undersea installations might be established; (2) waste disposal considerations; (3) the estimation of deposit structure, chemistry, and size prior to development; and (4) the use of geothermal deposits in the undersea environment including their relative merits as opposed to fossil fuels and reactors. (Author)

AD-636 932 **Field 8J, 8C, 8G**
CFSTI Prices: HC$1.00 MF$0.50
Woods Hole Oceanographic Institution, Mass.
TRACK CHARTS, BATHYMETRY, LOCATION OF OBSERVATIONS AND CRUISE JOURNAL, GOSNOLD CRUISE NO. 73. GEOLOGICAL AND GEOPHYSICAL INVESTIGATIONS IN THE REGION OF THE PROPOSED SITE FOR PROJECT SEA SPIDER. PART Ia, JULY 9 - AUGUST 6, 1965.
Summary technical rept.
by A. J. Erickson, and J. M. Woodside. Feb 66, 25p Ref-66-6
Contract Nonr-4029 (00)
Proj. NR-260-101

Descriptors: (*Atlantic Ocean, *Hydrographic surveying), Oceanographic data, Maps, Oceanology.

Identifiers: Sea Spider project, Gosnold Cruise 73.

On GOSNOLD Cruise No. 73, 9 July - 6 August, 1965, a program of geophysical and geological research was conducted on the Blake Plateau in the vicinity of the proposed Sea Spider location. On the basis of a detailed topographic survey over a 6 x 7 mile area it was determined that the bottom was absolutely flat, with a decrease of 2 fathoms from north to south, and an average depth of 439.4 fm. Pipe dredge stations on a SE-NW traverse across the surveyed area yielded coarse, organic, calcareous sand. Current measurements using three different types of drogues indicated highly variable currents, reversing direction over a period of five days and ranging in velocity from 0.2 knots to 0.5 knots. Work on this leg of the cruise was completed with the installation of two marker buoys set on an E-W line near the center of the surveyed area. (Author)

AD-636 987 **Field 8J, 8C**
CFSTI Prices: HC$4.00 MF$0.75
Woods Hole Oceanographic Institution, Mass.
CHAIN CRUISE NO. 55. TRACK CHARTS, BATHYMETRY, AND LOCATION OF OBSERVATION NORTH ATLANTIC OCEAN - CARIBBEAN SEA.
Technical summary rept., 11 Nov-19 Dec 65.
by John E. Arena. Mar 66, 115p WHOI-Ref-66-7
Contract Nonr-4029 (00)
Proj. NR-260-101

Descriptors: (*Atlantic Ocean, *Hydrographic surveying), (*Caribbean Sea, Hydrographic surveying), Oceanographic data, Maps.

Identifiers: Chain Cruise No 55.

This report contains charts of cruise 55 of CHAIN in the North Atlantic Ocean and Caribbean Sea. There are 51 charts plotted on a Mercator Projection (scale 1 degree longitude equals 4 inches) showing the track of the entire cruise. All types of observations made during the cruise are noted by suitable symbols or legends along the ship's track. The location of special observations are shown on Chart 1. Soundings are read at equal time intervals, usually every ten minutes, and at each break in slope. They are written along the ship's track as often as space permits. All soundings are based on a sound velocity of 800 fathoms/sec. and are corrected only for depth-of-transducer. (Author)

AD-636 995 **Field 8J**
CFSTI Prices: HC$2.00 MF$0.50
Scripps Institution of Oceanography, San Diego, Calif. Marine Physical Lab.
TEMPERATURE STRUCTURE IN THE TRANSITION REGION OF THE NORTH PACIFIC.
by Margaret K. Robinson, and John Northrop.
6 Jul 66, 29p
Contract Nonr-2216 (23)
Proj. NR-083-005
Published in the Proceedings of the U. S. Navy Symposium on Military Oceanography 5-7 May 1965, held at Naval Ordnance Lab., White Oak, Md. p403-32.

Descriptors: (*Pacific Ocean, Bathythermograph data), Oceanographic data, Graphics, Tables, Hydrographic data.

Identifiers: FLIP.

Only those aspects of the oceanographic program related to the variability of the temperature-depth structure and, indirectly, to the sound velocity-depth structure are discussed here. They include: (1) variability of the temperature-depth structure related to internal waves and to season; (2) results of the time-series analysis of the 6-minute thermistorchain temperature record, including power spectra, auto-correlation functions, and time lag statistics of the oscillations of selected isotherms; (3) T-S curves and envelops of observed T and S values showing changes in T-S depth structure which produce a secondary sound channel at approximately 100 meters depth; and (4) implications of these observations for prediction of oceanographic parameters and for Navy operational and observational programs. (Author)

AD-636 920 **See Field 18L**

AD-636 923 **See Field 20A**

AD-636 951 **See Field 8M**

8K. SEISMOLOGY

AD-636 430 **Field 8K**
CFSTI Prices: HC$3.00 MF$0.50
Uppsala Univ. (Sweden). Seismological Inst.
MULTICHANNEL Z-TRANSFORMS AND MINIMUM-DELAY.
by Enders A. Robinson. 29 Mar 66, 51p
Scientific-35
Contract AF 61 (052)-702, ARPA order-292
AFCRL-66-506

Descriptors: (*Integral transforms, *Time-lag theory), (*Seismic waves, Propagation), Data, Reflections, Sweden.

The concept of minimum-delay (i.e. minimum-phase) is an important link in tying together the deterministic approach and the statistical approach to seismology. By the use of multichannel z-transforms we have shown how this concept can be extended to the multichannel case. With this approach the theory of multichannel filters can be built up in an analogous manner to single-channel theory. In particular the method of multichannel predictive deconvolution can be applied to multitrace seismograms for the elimination of reverberations. Because multichannel filters are able to exploit the correlations existing from trace to trace and record to record we can expect better results in many applications where single-channel digital filters are now being used to process seismic data. Much work remains to be done; however the promise of multichannel data processing is bright. (Author)

AD-636 492 **Field 8K, 20A**
CFSTI Prices: HC$3.00 MF$0.75
Brown Univ., Providence, R. I. Div. of Applied Mathematics.
WAVE PROPAGATION IN THE EARTH.
Technical rept.
by K. N. Sawyers, and R. S. Rivlin. Jun 66, 95p
TR-15
Contract Nonr-562 (40)
Proj. NR-064-406

Descriptors: (*Seismic waves, Propagation), (*Acoustics, *Earth (Planet)), Earth models, Elasticity, Seismology, Mechanical waves, Propagation.

The problem of wave propagation is considered for three different self-gravitating elastic spheres. In the first the initial state of stress is radially symmetric and the sphere is transversely isotropic with respect to the radial direction at every point. In the second the state of stress is isotropic at every point, and the elastic properties are as in the first sphere. The third sphere corresponds to the usual isotropic Earth model used in seismology theory. The general solution for SH-type wave fronts is obtained for all three spheres and the results are compared from the point of view of applying seismographical T-delta data to determine the variation of wave speed with depth. (Author)

AD-636 726 **Field 8K, 8G**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
SEISMIC PROPAGATION STUDIES IN THE ARCTIC REGION USING NOVEL TYPE OF ELECTROMECHANICAL TRANSDUCER.
Technical rept.
by Ronald F. Johnson, and Wolfgang H. Fischer.
Jul 66, 47p ECOM-2713
Proj. DA-1P0-14501-B31A
Task 01

Descriptors: (*Seismic waves, Propagation), (*Geophysical prospecting, Seismic waves), Arctic regions, Permafrost, Glaciers, Geophysics, Seismology, Transducers.

Various measurements were made using a novel type of transducer for generating and receiving continuous seismic waves (CSW) in different media. The performance of these transducers on thin lake ice suggested that the range of application should be extended to permafrost and glacial ice. Experiments and measurements that were made in the area of Camp Tuto, Greenland, June 1965, are discussed in this report. The results of these experiments have shown that CSW propagation is possible in glacial ice as well as in permafrost. With power levels on the order of a few watts at the transmitter transducer the signal could be received over distances up to 200 m. For the transition zone in glacial ice the attenuation was found to be about 0.3 dB/m, whereas the very low value of 0.02 dB/m caused by a ducting effect existed in permafrost. Propagation experiments were also made in the ice tunnel near Camp Tuto. (Author)

AD-636 919 **Field 8K**
CFSTI Prices: HC$3.00 MF$0.75
Emmanuel Coll., Boston, Mass. Oriental Science Library.
A STUDY OF THE P AND S WAVES AT 5 - 30 DEGREES AND OF THE STRUCTURE OF THE EARTH'S MANTLE (I).
Research translation.
by Mei Shih-Yung, and Lin Pang-Huei. Apr 66, 63p Emm-65-31
Contract AF 19 (628)-5073
TT-66-62018

Descriptors: (*Seismology, China), Earthquakes, Seismic waves, Propagation, Structural geology.

Identifiers: P waves, S waves.

This paper presents a study of the P and S waves in 37 different earthquakes. It shows that in the eastern part of China, there are marked regional differences in the characteristics of these waves. These differences could depend directly on the structural differences in the earth's mantle. The paper proves that there are low-velocity layers in the mantle and shows that there are regional differences in the characteristics of these layers. It also discusses the possibility of the existence of two surfaces of discontinuity in the mantle. (Author)

AD-636 967 **Field 8K, 8G**
CFSTI Prices: HC$3.00 MF$0.50
Alaska Univ., College. Geophysical Inst.
FUNDAMENTAL AND APPLIED RESEARCH IN SEISMOLOGY IN ALASKA.
Final rept., 1 Jul 64-31 Dec 65.
by Eduard Berg. May 66, 52p UAG-R-179
Grant AF-AFOSR-701-64, ARPA Order-292-63
Proj. 3810

Descriptors: (*Seismology, *Alaska), (*Earthquakes, Alaska), Seismic waves, Energy, Intensity, Structural geology, Geophysics, Seismological stations.

Identifiers: Tectonics, Longshot operation.

A catalogue of earthquakes using all available sources was compiled, including earthquakes up to summer 1965. Energy release of the Aleutian Chain, Alaska and the southeast was studied and mapped. About one half of the total energy was released along the coastal region of the Alaska mainland. There was also significant activity along a branch reaching into the Fairbanks area including three shocks with magnitudes in the 7 1/2 range since 1904. Fault plane solutions from the main and a series of aftershocks of the March 28, 1964 earthquake indicated that the predominant compressional force system was more or less directed perpendicular to the range. There was strong indication that the March 28, 1964 Alaskan earthquake and the major aftershocks of (U.S.C. and G.S.) magnitude > or = 5.5 (except for the first 24 hours) and located on the continental shelf were possibly triggered by low ocean tide loads. The observation was consistent with the force system derived from fault plane solutions and the land uplift and subsidence which occurred during the main shock. The pressure variation during an ocean tide cycle on the bottom of the shelf area was considered significant in carrying the last part of the stress-strain curves of the rock into the 'strain softening' region towards failure. During the 'Longshot' experiment, not only clear compressional P waves but also outstandingly clear PcP waves have been observed in the distance range 1800 to 2600 km. (Author)

AD-637 009 **Field 8K, 17J**
CFSTI Prices: HC$3.00 MF$0.75
General Atronics Corp., Philadelphia, Pa.
LARGE APERTURE SEISMIC ARRAYS.
Quarterly technical rept. no. 1, Jan-Mar 66.
5 Jul 66, 98p Rept. no. 1531-2033-7
Contract AF 19 (628)-5981, ARPA Order-800
ESD-TR-66-489

Descriptors: (*Seismic waves, Dection), (*Seismology, Instrumentation), Geometry,

Configuration, Seismometers, Seismographs, Data processing systems, Theory, Correlation techniques, Attenuation, Earthquakes, Nuclear explosions, Performance (Engineering).

The work dealt with the effect of seismometer placement on array sidelobes, the performance to be expected with arrays using one bit signals from the seismometers, the coherence of signals, noise, and coda across LASA, P-coda correlation as a discriminant and the frequency dependence of attenuation in the earth's upper mantle. A randomized array, as opposed to one with clustered elements, has shown sidelobes some 14 dB lower than those of the current LASA design. The one bit array (DIMUS) has shown a processing gain of 2 dB less than that for an analog array, as predicted by theory. The same array with the addition of a single analog channel offers good possibilities of proving as useful in identification as a conventional array. Main P, and noise correlations observed across LASA Montanna from LONGSHOT showed signal correlation to be high, 0.97, and noise quite low for spacings equal to those of the clusters. P-coda correlation decreased to a value near zero for seismometer spacings on the order of 150 km. Study of P-coda correlation coefficients for widely spaced seismometers fell into two distinct distributions with an equivalent S/N of 16 dB. A method was developed for estimating the Q of the upper mantle using the P and pP phases of deep earthquakes. First test of the method indicate an average Q of approximately 200 for the upper 500 km of the mantle in the Fiji Islands Region. (Author)

AD-636 949 **See Field 14B**

AD-636 979 **See Field 17J**

AD-636 980 **See Field 17J**

AD-637 016 **See Field 17J**

8L. SNOW, ICE, AND PERFAFROST

AD-636 296 **See Field 13A**

AD-637 112 **See Field 13M**

8M. SOIL MECHANICS

AD-636 443 **Field 8M, 14B**
CFSTI Prices: HC$4.00 MF$0.75
Northwestern Univ., Evanston, Ill. Technological Inst.
A RHEOLOGIC INVESTIGATION OF THE DYNAMIC RESPONSE SPECTRA OF SOILS.
Rept. no. 4.
by R. L. Kondner. Jun 65, 101p
Contract DA-22-079-eng-316
Task 13.009
AEWES-CR-3-62
Rept. on High Speed Explosive Pulse Type Compression Apparatus for the Dynamic Testing of Cohesive Soils. See also AD-613 071.

Descriptors: (*Rheology, Soil mechanics), (*Soil mechanics, Instrumentation), Presses (Machinery), Explosive actuators, Soils, Compressive properties, Dynamics, Test methods.

The basic development and operation characteristics of a high speed, explosive, pulse type compression apparatus for the dynamic testing of cohesive soils is presented. Dynamic loading is obtained by firing a Springfield 30-06 cartridge charged with gunpowder into a combustion chamber. The high pressure developed drives a piston and deforms the soil specimen in unconfined compression. Details of the design, construction, and instrumentation of the device are given. In addition, performance characteristics as well as preliminary results of a limited test program are also reported. The range of the time spectrum studied is from approximately 0.1 milli-second to 5 miliseconds. The apparatus is discussed both as a table-top device and for use in conjunction with large static type testing machines. Correlation of acceleration, velocity, displacement, and force measurements are presented and inertial effects are discussed. Test results are given for soil specimens with moisture contents ranging from 24.6 percent to 39.9 percent. Dynamic stress-strain response is represented by a hyperbolic equation and values of initial compliance are compared with the initial compliance-time spectrum developed from the results of creep and steady state vibratory test programs. Total strain and elastic strain spectra are compared and discussed in terms of applicable strains. Blast pulse response is shown to be in excellent agreement with the creep-vibratory total strain response spectra. (Author)

AD-636 446 **Field 8M, 14B**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Soil Mechanics Div.
USE OF ELECTRICAL PRESSURE TRANSDUCERS TO MEASURE SOIL PRESSURE.
Phase rept. no. 5 on research in earth physics.
by Richard S. Ladd. Dec 65, 83p R65-48
Contract DA-22-079-eng-457
Proj. 1-V-0-14501-B-52A-01
AEWES-CR-3-101
See also AD-632 061.

Descriptors: (*Transducers, Pressure), (*Soil mechanics, Pressure), Soils, Measurement, Clay, Calibration.

The application of electrical transducers to measure soil pressures against planar surfaces is described, with emphasis on the determination of the coefficient of earth pressure at rest (K sub o) for cohesive soils. Data are presented on the value of K sub o for a saturated silty clay (Boston Blue Clay) as a function of consolidation pressure, maximum past pressure and overconsolidation ratio. These data were obtained via a square fixed ring oedometer which had a Dynisco pressure transducer screwed into one side of the cell. Although the observed values of K sub o appear reasonable and are consistant with other published data, the degree of accuracy is unknown. Attempts to calibrate the transducer by comparing measured versus applied average pressures on a planar surface are described. These results indicated that the measured pressure is directly related to the applied soil pressure. (Author)

AD-636 803 **Field 8M**
CFSTI Price: MF$0.75
Massachusetts Inst. of Tech., Cambridge. Soil Mechanics Div.
ON THE SECONDARY COMPRESSION OF SATURATED CLAYS.
Phase rept. no. 6 on Research in Earth Physics.
by Charles C. Ladd, and William B. Preston. Dec 65, 120p RR-R65-59
Contract DA-22-079-eng-457
Proj. 1-V-0-14501-B-52A-01
AEWES-CR-3-101

Descriptors: (*Clay, Compressive properties), (*Soil mechanics, Clay), Foundations (Structures), Civil engineering, Experimental data.

Secondary compression refers to a volume decrease which occurs under conditions of seemingly constant effective stress at the end of primary consolidation, i.e., after excess pore pressures are essentially dissipated. Experimental data are presented on the effects of stress history and type of stress system on the rate of secondary compression of two saturated remolded clays, namely a lean silty clay (Boston Blue Clay - BBC) and a silty clay of high plasticity (Vicksburg Buckshot Clay - VBC). The stress systems studied are one-dimensional compression with K sub o stresses as represented by the conventional oedometer test and isotropic compression (K = 1) as measured in a standard triaxial cell with a uniform pressure. The oedometer and triaxial test data on BBC yielded the same rate of secondary compression; the data on VBC were inconclusive. Data by Ray (1963) on this topic, which showed a marked effect of the value of K on the rate of secondary compression, are presented and analysed. The effects of stress history and stress system are discussed in terms of soil structure (structure equals fabric plus interparticle forces). (Author)

AD-636 951 **Field 8M, 14B, 8J**
Army Coastal Engineering Research Center, Washington, D. C.
A TRACTOR-MOUNTED SUSPENDED-SAND SAMPLER.
by John C. Fairchild. Jun 66, 6p R-4-66

Descriptors: (*Samplers, *Sedimentation), (*Sand, Sedimentation), (*Soil mechanics, Samplers), Earth-handling equipment, Tractors, Pumps.

The tractor-mounted suspended sand sampling system uses a high-lift pump and a water-sand filtration (decanting) system positioned at pier deck level. The system developed consists of a boom-mounted telescoping support pipe which serves to position an intake nozzle at some sampling elevation above the ocean bottom. The support pipe may be released allowing it to extend (slide in brackets) to the ocean bottom, with the foot spike penetrating the bottom. Next, the sampling nozzle and intake pipe, attached to the support pipe by roller guide brackets can be lowered to the desired level for pumping a quantity of water-sand mixture. This pipe with suction nozzle at its end in winch controlled and will descend into the water under the force of its weight.

AD-636 580 **See Field 6F**

8N. TERRESTRIAL MAGNETISM

AD-636 545 **Field 8N, 4A, 3B**
Harvard Coll. Observatory, Cambridge, Mass. Solar Dept.
DEPENDENCE OF THE LUNAR MODULATION OF GEOMAGNETIC ACTIVITY ON THE CELESTIAL LATITUDE OF THE MOON.
Revised ed.
by Barbara Bell, and Richard J. Defouw. 13 Oct 65, 11p Scientific-9
Contract AF 19 (628)-3322
Proj. AF-7649
Task 764906
AFCRL-66-262
Revision of manuscript submitted 13 Aug 65.

Descriptors: (*Moon, *Terrestrial magnetism), Celestial mechanics, Astrophysics, Geophysics.

Evidence is presented indicating that two factors play a part in the lunar modulation of geomagnetic activity: (1) Phase of the moon: the average level of geomagnetic activity is diminished for several days before full moon and enhanced for several days after full moon. (2) Celestial latitude of the moon: activity is diminished when the moon is closer to the plane. Approximately from first quarter to last quarter, when these two factors work together the greatest amplitude of modulation occurs; when they work against each other no significant modulation of geomagnetic activity is detected. There is no evidence of any significant lunar influence on geomagnetic activity over the new-moon half of the orbit. These results are discussed in terms of recent observations of the earth's magnetic tail. (Author)

N66-17613 **Field 8N**
CFSTI Prices: HC$4.00 MF$0.75
Kakioka Magnetic Observatory (Japan).
REPORT OF THE KAKIOKA MAGNETIC OBSERVATORY. GEOMAGNETISM, 1960.
by T. Yoshimatsu. 1965, 119p Rept. no. 35

Descriptors: *Geophysical observatory, *Magnetic measurement, *Geomagnetic field, *Japan.

For abstract, see T 66 18.

AD-636 500 **See Field 14B**

AD-636 970 **See Field 8G**

9A. COMPONENTS

AD-453 320 **Field 9A**
CFSTI Price: HC$2.00
Royal Aircraft Establishment, Farnborough (England).
ANALYSIS OF ELECTRIC CIRCUITS WITH THE AID OF A DIGITAL COMPUTER.
Technical note.
by M. Newby. Aug 64, 32p TN-MATH-114

Descriptors: (*Digital computers, Circuits), (*Circuits, Programming (Computers)), Alternating current, Direct current.

The analysis of complex electric circuits is a long and tedious procedure, and so programmes have been developed for a digital computer to perform both A-C and D-C analysis. The user has only to specify the circuit in terms of the various components connecting its nodes.

AD-457 611 **Field 9A**
CFSTI Price: HC$1.00
Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
DEVELOPMENT OF EXPERIMENTAL GAS DISCHARGE DISPLAY.
Quarterly progress rept. no. 5, 24 Sep-24 Dec 64.
24 Dec 64, 14p GRR-65-1017
Contract NObsr-89201
Proj. SR0080301
Task 9498

Descriptors: (*Display systems, Gas discharges), Neon, Argon, Krypton, Voltage, Design, Configuration, Feasibility studies, Performance (Engineering), Costs.

The purpose of this program is to develop an experimental prototype gas discharge display panel with internal storage capability. The panel will consist of a X-Y matrix of individual gas cells, each of which can be selected and fired by the application of a short triggering pulse. The objectives are to develop a display with high light output, low firing and distribution voltages, and a configuration such that eventual production panels can be fabricated at the lowest possible cost per unit cell. Experiments were conducted to determine the control parameters for increasing delta V to a desirable level. Subsequent to this, a number of 100-cell gas conduction displays having feedthroughs to the individual cells were fabricated and successfully operated. (Author)

AD-476 369 **Field 9A, 9E, 18H**
CFSTI Prices: HC$4.00 MF$0.75
Boeing Co., Seattle, Wash. Aerospace Div.
TRANSIENT RADIATION EFFECTS ON MICROELECTRONICS.
Final technical rept., Jan-Jul 65.
by William C. Bowman, and Robert S. Caldwell.
Dec 65, 103p D2-90696-1
Contract AF 30 (602)-3585
Proj. AF-5710
RADC-TR-65-355
See also AD-477 033.

Descriptors: (*Radiation damage, Electronic equipment), (*Microminiaturization (Electronics), Radiation damage), (*Gates (Circuits), Radiation damage), (*Integrated circuits, Radiation damage), (*Semiconducting films, Radiation damage), Transients, Ionization, Secondary emission, Neutrons, Failure (Electronics), Transistors, Gain.

The objective of this study was to investigate the effects of transient radiation on microcircuits. Specifically, the relationship between microcircuit fabrication techniques and the response of the microcircuit to transient radiation was to be analyzed. It was demonstrated that the hardness of a microcircuit is dependent upon the fabrication process. Of greater importance, however, was the fact that circuit design apparently plays an equal, if not greater, role in the hardening of a microcircuit. This fact will be further investigated in follow-on studies as a second step towards attaining the final goal of hardening microcircuits to a level commensurate with service operational requirements.

AD-478 704 **Field 9A**
CFSTI Prices: HC$4.60 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
MICROWAVE ROTARY JOINTS FOR X-, C-, AND S-BANDS.
by Basil J. Nicholson. 30 Nov 65, 48p
Contract DA-01-021-AMC-11706 (Z)
RSIC-503

Descriptors: (*Waveguide couplers, Radar Antennas), (*Coupled Antennas, Antenna feeds), X band, C band, S band, Waveguide circulators, Antenna components, Coupling circuits, Resonance, Cascade structures, Broadband.

This report consists of an examination of post-1950 rotary joint designs for use at X-, C-, and S-bands. Among the topics discussed are single and multichannel rotary joints with coaxial line or rectangular waveguide inputs. Since the simplest waveguide rotary joints incorporate transitions from rectangular to circular waveguide or from rectangular waveguide to a coaxial line, calculations are included on the relative power-handling capabilities of circular waveguide, rectangular waveguide, and coaxial line when subject to the conditions necessary for proper functioning of a rotary joint. A detailed examination is made of rectangular waveguide joints of the coaxial line, circular waveguide, coaxial mode convertor, and of the annular varieties. It is shown that, in the circular waveguide variety, either a circularly polarized H11 mode or an E01 mode can be used. Methods of avoiding undesirable performance due to resonances in the circular waveguide are discussed. Methods are described of using circular waveguide rotary joints for dual-channel applications. Rotary joints, incorporating a section of coaxial line, are discussed; it is shown that, for 'around-the-mast' applications, by employing special feeds to the coaxial section, coaxial-line dimensions can be increased without appreciably exciting higher, undesirable modes which could in theory propagate.

AD-636 320 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Chalmers Univ. of Technology, Goteborg (Sweden). Research Lab. of Electronics.
NONLINEAR THEORY OF THE PLANAR MICROWAVE VACUUM DIODE.
Research rept. (technical note).
by S. Wallander. 1 Apr 66, 25p RR-58, TN-9
Contract AF 61 (052)-594
Report on Nonlinear Microwave Tube Studies.

Descriptors: (*Microwave equipment, *Diodes (Electron tubes)), Theory, Nonlinear systems, Power series, High frequency, Sweden.

For abstract, see T 66 18.

AD-636 410 **Field 9A, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Army Electronics Command, Fort Monmouth, N. J.
DEPOSITION TECHNIQUES FOR THIN-FILM PASSIVE PARTS.
Technical rept.
by I. H. Pratt. Jul 66, 70p TR-ECOM-2725
Proj. DA-1C0-24401-A-348
Task 1C0-24401-A-348-00-53

Descriptors: (*Films, Deposition), Vacuum apparatus, Vapor plating, Sputtering, Anodic coatings, Circuits, Microminiaturization (Electronics), Integrated circuits, Resistors, Capacitors, Silicon, Oxidation.

The methods described are divided into four basic classes: vacuum evaporation, sputtering, oxidation, and vapor plating. Vacuum evaporation, normally carried out in a vacuum of 0.00001 to 0.000001 torr, utilizes various means to raise the temperature of a material to the point where thermal evaporation occurs, including resistance and induction heated sources, electron beam heating, and flash evaporation. Sputtering is normally carried out in a gas pressure of 2-10 x 0.01 torr. In contrast to vacuum evaporation the process involves the removal of cathode material by a stream of high velocity positive ions, and (besides the classical method of cathodic or diode sputtering) includes the more recent techniques of triode, reactive, and RF sputtering. The oxidation of metals by metal gas combination is another means of forming dielectric films. The preparation of metal oxides for thin-film circuitry application has included wet chemical anodization, thermal oxidation, and the relatively new process of plasmionic anodization. In addition, vapor plating processes are being developed and include the deposition of films by chemical decomposition or reduction. (Author)

AD-636 420 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Delaware Univ., Newark. Dept. of Physics.
MULTILAYER OHMIC CONTACTS ON CdS.
Technical rept.
by Karl W. Boer, and Robert B. Hall. Jul 66, 22p
TR-10
Contract Nonr-4336 (00)
Supported in part by NASA.

Descriptors: (*Semiconductor devices, *Electric terminals), (*Cadmium compounds, Sulfides), Circuit interconnections, Electrodes, Vapor plating, Titanium, Aluminum, Platinum, Evaporation, Electrical properties, Laminates.

Identifiers: Cadmium sulfide.

A multilayer technique is proposed for evaporation of ohmic contacts onto CdS which does not change their electrical properties after heat treatment up to 350C. This technique consists of a sequential evaporation of a preparative layer, an active metal and possibly a covering metal. The Ti (preparative)-Al (active)-Pt (cover) sequence was found most successful. All of the more than forty evaporations investigated -on CdS single crystals, or on evaporated recrystallized layers- showed ohmic characteristics between 2 mV and 200 V and showed generation-recombination noise above (at most) 500 Hz. The electrical properties of the contacts did not markedly change after vacuum heat treatment up to 350C. (Author)

AD-636 449 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Mallory (P. R.) and Co., Inc., Indianapolis, Ind.
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID ELECTROLYTE TANTALUM CAPACITORS.
Quarterly rept. no. 11, 30 Dec 65-29 Mar 66.
by A. W. H. Smith. 29 Mar 66, 11p
Contract DA-36-039-AMC-03623 (E)
See also AD-636 449.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Life expectancy, Reliability (Electronics), Failure (Electronics), Electrolytic capacitors.

With the completion of Group A tests on the replacement 68 mfd 15V capacitors, the final life test oven load has begun testing. A total of 17.2 million unit hours of 85C test has been accumulated. With one failure, this represents an overall fai-

lure rate of 0.012% per 1000 hours at 60% confidence. (Author)

AD-636 481 **Field 9A, 9E**
CFSTI Prices: HC$1.00 MF$0.50
Radio Corp. of America, Somerville, N. J. Electronic Components and Devices.
DEVELOPMENT OF A TRANSISTOR-VARACTOR DIODE CAPABLE OF 5 WATTS OUTPUT AT 2.3 GIGAHERTZ.
Interim technical rept. no. 4, 1 Mar-31 May 66.
by D. S. Jacobson, and H. C. Lee. 31 May 66, 19p

Contract AF 33 (615)-2486
See also AD-635 831.

Descriptors: (*Semiconductor devices, Microwave equipment), (*Frequency multipliers, Semiconductor devices), Transistors, Varactor diodes, Radiofrequency power, Photoengraving, Diffusion, Failure (Electronics), Packaging, Coaxial cables, Amplifiers.

Photomasks for a webbed base finger metallizing pattern were designed, fabricated and successfully utilized to define the metallization pattern on a number of TA2790 wafers. These masks were designed to eliminate the 'pinch-off' of the base fingers at their intersection with the collector oxide. Devices processed, from recent diffusion runs exhibited improved UHF amplifier and amplifier-multiplier performance, however, these devices showed a tendency toward catastrophic failure during operation. Diffusion runs on wafers with redesigned epitaxial layers have been initiated to minimize burn-out difficulties. Photomasks for a two-step integral lead process were fabricated and evaluated. Difficulties encountered in the definition of the final integral lead pattern were attributed to photomask defects. TA2790 units mounted in plastic coaxial packages were evaluated at 1 gigahertz as common base amplifiers. A power output of approximately 3.5 watts and a collector efficiency of 39 percent with a 0.5-watt drive were obtained for these units. This represents a significant improvement in performance over that of devices mounted in stripline packages. (Author)

AD-636 565 **Field 9A, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Ballistic Research Lab., Aberdeen Proving Ground, Md.
A NEW LIMITATION IN FIELD-EFFECT TRANSISTOR OPERATION.
Memorandum rept.
by Keats A. Pullen Jr. Apr 66, 22p BRL-MR-1746
Proj. RDT/E-1L013001A91A

Descriptors: (*Transistors, Transport properties), Semiconductors, Radiation damage, Carriers (Semiconductors), Diffusion, Electrical conductance.

Identifiers: Field-effect transistors.

A recent study of the behavior of the channel in a field effect transistor indicates that the diffusion mode of operation is the fundamental mode. An additional probable conclusion is that all solid state active devices developed will prove to be transconductance controlled and their transconductance limits can be defined in terms of the Fermi constant. (Author)

AD-636 575 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Norwood, Mass.
PRODUCTION ENGINEERING MEASURE FOR CAPACITORS, FEED-THROUGH SOLID, ELECTROLYTE TANTALUM PELLET.
Quarterly rept. no. 9, 1 Apr-30 Jun 66.
by W. G. Bailey, 30 Jun 66, 13p
Contract DA-36-039-AMC-03630 (E)
See also AD-633 062.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Quality control, Seals, Test facilities, Pellets, Electrolytes, Solids, Aging (Materials).

A revised edition of the Inspection and Quality Control Plan was submitted and approved. The balance of the capacitor end seals were received during this period, thus enabling the complete assembly of three of the five required production lots. The fourth lot was completed up to the point of doing the seal test and test for shorts. Lot five was complete to the point of welding the finished anode to the feed-through stud. Aging and life test facilities were completed during this quarter. Lots 1, 2, and 3 were placed on aging for 1000 hours, minimum.

AD-636 576 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Norwood, Mass.
PRODUCTION ENGINEERING MEASURE FOR PRODUCTION OF SILICON MONOXIDE CAPACITORS.
Quarterly rept. no. 12, 1 Mar-31 May 66.
by Welville B. Nowak, 31 May 66, 11p
Contract DA-36-039-AMC-01478 (E)
See also AD-632 229.

Descriptors: (*Capacitors, Manufacturing methods), (*Silcon compounds, Ceramic capacitors), Monoxides, Microminiaturization (Electronics), Life expectancy, Performance (Engineering).

Group C testing was completed and no failures were encountered. (Author)

AD-636 679 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Westinghouse Defense and Space Center, Baltimore, Md.
15 KW TRANSMISSION LINE MATCHING TRANSFORMER.
Interim development rept. for 1 Jan-31 Mar 61.
31 Mar 61, 8p
Contract NObsr-72661
See also AD-265 433.

Descriptors: (*Transformers, Transmission lines), Radiofrequency, Medium frequency, High frequency, Impedance matching, Standing wave ratios, Design, Radiofrequency power.

Progress is reported on a program to design and build two transmission line matching transformers which operate over the frequency range 2 to 30 mc with a power rating of 15 KW, 100 per cent modulated, and which are capable of transforming an unbalanced primary load (70 ohm resistive impedance with a VSWR no greater than 3 to 1) to a balanced secondary load (600 ohm impedance with a VSWR no greater than 3 to 1). The transformer also should be capable of transforming a 600 ohm balanced primary load to a 70 ohm unbalanced secondary load, where these impedances have the same VSWR variation. (Author)

AD-636 762 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Raytheon Co., Moutain View, Calif. Semiconductor Operation.
SILICON, PNP, MEXA TRANSISTOR TYPES JAN 2N328A AND JAN 2N329A.
Quarterly progress rept. no. 2, 1 Mar-29 May 66.
by Frank Chien, and Sidney Wiesner. 29 May 66, 22p
Contract DA-36-039-AMC-06172 (E)

Descriptors: (*Transistors, Silicon), Manufacturing methods, Reliability (Electronics), Diffusion, Epitaxial growth, Disks, Etching.

Experimental lost of MEXA Transistors incorporating the following programmed process improvements were fabricated in the engineering laboratory and submitted for reliability evaluation. The subtle epitaxial wafer material problem encountered during the first quarter of performance was corrected by the application of replacement material, i.e., wafers from a subsequent lot of purchased material which precluded channeling. Recurrence of the difficulty is expected to be avoided by qualifying each material shipment prior to production until material confidence has been restored. The evaluation results of Lots A through H incorporating the Isolation Diffusion and Spray Etch process improvements indicate substantial improvement in device reliability. Lots I through M are now being evaluated for reliability results. (Author)

AD-636 775 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Sprague Electric Co., North Adams, Mass.
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID ELECTROLYTE TANTALUM CAPACITORS.
Quarterly rept. no. 11, 29 Dec 65-29 Mar 66.
by J. H. D. Folster, and E. J. Fresia. 29 Mar 66, 12p
Contract DA-36-039-AMC-03621 (E)
See also AD-630 253.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Reliability (Electronics), Life expectancy, Leakage (Electrical).

The 10,000-hr life test of 9150 capacitors of nine different ratings has reached the 4000-hr point. Readings from a preselected statistically randomized sample are presented. Also included is a summary of the completed Groups B and D inspections required by Military Specification MIL-C-39003. (Author)

AD-636 778 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Irmo, S. C. Electronic Specialty Capacitor Business Section.
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF HERMETICALLY SEALED TANTALUM FOIL CAPACITORS.
Quarterly rept. no. 3, 20 Mar-20 Jun 66.
by R. M. Trewhella. 20 Jun 66, 22p
Contract DA-36-039-AMC-06169 (E)
See also AD-633 057.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Reliability (Electronics), Foils, Hermetic seals, Life expectancy, Electrolytes, Leakage (Fluid), Welding.

The accomplishments during the period were the continued evaluation of the special capacitors in product improvement evaluation program. The units completed 2,000 hours on the 125C operating life test without a catastrophic failure. Some of the units made with the various design and process modifications started to show a difference in parameters relative to the reference measurements. Efforst were continued to improve the overall quality of the unit and to reduce in-process losses and potential capacitor failures. The results of the final seal test program indicated that the weight loss method of leak detection to be the most sensitive of the three methods as applied to hermetically sealed tantalum foil capacitors. The drawing lists were revised to incorporate the final design selected for the units in the production run. The fabrication of the 9,150 test units was started during this quarter. (Author)

AD-636 798 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Bliley Electric Co., Erie, Pa.
PRODUCTION ENGINEERING MEASURE CR-(XM-53)/U QUARTZ CRYSTAL UNITS.
Quarterly rept. no. 4, Aug-Oct 65.
by J. M. Wolfskill, Merle George, and Robert Mouck. Oct 65, 24p
Contract DA-36-039-AMC-03640 (E)
See also AD-636 802.

Descriptors: (*Quartz resonators, Manufacturing methods), Crystal holders, Reliability (Electronics), Performance (Engineering).

Identifiers: CR- (XM-53)/U crystal units.

This report covers the fourth quarterly period of the combined Production Engineering Measure and Reliability Study on CR- (XM-53)/U crystal units. Special mounting arrangements for 1-megahertz crystals were investigated. 'Claw' mounts could meet the million-Q requirement, but yields were too low to support production and fabrication was difficult. A 'four-point, spring pressure' mounting was derived which gives promise of meeting the CR- (XM-53)/U requirements with reasonable yields: Q levels are good and units are not as sensitive to shock disturbances as the previous designs. (Author)

AD-636 801 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Sprague Electric Co., North Adams, Mass.
PRODUCTION ENGINEERING MEASURE FOR MECHANIZATION OF HIGH RELIABILITY CAPACITORS.
Quarterly rept. no. 13, 1 Jan-31 Mar 66.
by J. H. D. Folster, and G. E. Walters. 31 Mar 66, 11p
Contract DA-36-039-AMC-01460 (E)

Descriptors: (*Paper capacitors, Manufacturing methods), (*Capacitors, Reliability (Electronics)), Plastics, Machines, Soldering, Conveyors.

Work in this quarter primarily was devoted to the final modification and adjustment of the machines preparatory to performing the 1200-capacitor trial run.

AD-636 802 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Bliley Electric Co., Erie, Pa.
PRODUCTION ENGINEERING MEASURE CR-(XM-53)/U QUARTZ CRYSTAL UNITS.
Quarterly rept. no. 5, Nov 65-Jan 66.
by J. M. Wolfskill, Merle George, and Robert Mouck. Jan 66, 21p
Contract DA-36-039-AMC-03640 (E)
See also AD-626 433.

Descriptors: (*Quartz resonators, Manufacturing methods), Crystal holders, Reliability (Electronics), Performance (Engineering), Aging (Materials).

Identifiers: CR- (XM-53)/U crystal units.

The work was devoted to the preliminary investigation of reliability. The goal of this program is to achieve a maximum failure rate of 1% per thousand hours with the 1000 pilot-run units, using a 6-month test at +85C to determine compliance. Frequency changes exceeding 4 x 10 to the minus 8th power per month and/or resistance increases of more than 15% are considered as failures. Tests were conducted on sample CR- (XM-53)/U units which had received no special processing or screening to improve reliability, other than the methods normally used on all precision crystal units. These tests indicate that the samples can meet or closely approach the requirements, but that losses because of holder failure, mostly cracking or leakage around the pins, keep both sealing yields and failure rates at unsatisfactory levels. (Author)

AD-636 806 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
Carnegie Inst. of Tech., Pittsburgh, Pa. Dept. of Electrical Engineering.
SEMICONDUCTOR HETEROJUNCTION STRUCTURE STUDIES.
Interim rept., 15 Dec 65-14 Jun 66.
by Donald L. Feucht, and Arthur G. Milnes. 14 Jun 66, 74p Scientific-1
Contract AF 19 (628)-5811
Proj. AF-4608
Task 460805
AFCRL-66-447

Descriptors: (*Semiconductor devices, Preparation), (*Triodes, Semiconductor devices), (*Zinc compounds, Crystal growth), (*Selenides, Crystal growth), Gallium alloys, Arsenic alloys, Germanium, Metallurgy, Electrical properties, Diffusion, Electrical contacts, Optical properties, Photoelectric cells (Semiconductor), Solar cells.

Identifiers: Germanium arsenide, Zinc selenide.

Research on the fabrication of a semi-insulating GaAs-Ge-Ge space charge limited triode is discussed. This includes a discussion of the close-speed gallium arsenide growth system and the metallurgical and electrical properties of the resulting growths. A method of diffusing a thin p type layer into n type germanium is discussed as well as a low temperature method of alloying contacts to gallium arsenide. The close-spaced growth of ZnSe on Ge for the study of the electrical and optical properties of the ZnSe-Ge heterojunction is described. Results of the growths and a means of making contact to ZnSe are discussed. A theoretical comparison of the optical properties of heterojunction and homojunction photocells is made and a photo-capacitive method of measuring very short lifetimes is considered for heterojunctions. (Author)

AD-636 807 **Field 9A, 20F**
CFSTI Prices: HC$1.00 MF$0.50
Dumont Electron Tubes, Clifton, N. J.
12 INCH DIAMETER CATHODE-RAY TUBE WITH FIBER OPTIC FACEPLATE.
Quarter interim development rept. no. 8, 1 Apr-30 Jun 66.
by Madison Cawein. 27 Jul 66, 5p
Contract NObsr-91206
Proj. SF0070501
Task 6030
See also AD-620 730

Descriptors: (*Cathode ray tubes, *Fiber optics), Manufacturing methods, Military requirements, Specifications, Electron tubes, Display systems.

In the eighth quarter, A new 12 inch fiber optic faceplate was fabricated, and subjected to a first inspection after rough polish. This preliminary inspection indicated that the plate might be acceptable, though not perfect. (Author)

AD-636 811 **Field 9A, 20L**
CFSTI Prices: HC$2.00 MF$0.50
Horizons, Inc., Cleveland, Ohio.
SOLID STATE THERMOSTATIC SWITCHES.
Final rept. 1 Feb-30 Sep 64.
by Virgil E. Straughan, Theodore M. Harkulich, and Richard A. Fotland. 30 Oct 64, 43p
Contract N161-25723
MEL-318/64

Descriptors: (*Thermal switches, *Electric switches), Solid state physics, Salts, Resistance, Ferroelectric materials, Tests.

Thermostatic switches involving the resistance change upon melting of hydrated inorganic salts have been developed. Switches composed of a combination of either hydrated potassium fluoride or cobalt bromide together with a desiccant and nucleating agent have a switching temperature of 41C while a similar switch, in which the inorganic salt is hydrated cobalt chloride, has a switching temperature of 51C. A resistance change of several megohms to several hundred ohms occurs over a temperature increment of 2C at the switching temperature. These switches are capable of being recycled several dozen times and of being subjected to overtemperatures to 100C. Experimental work was performed in order to optimize the highly nonlinear resistance effect in doped ferroelectric materials as a thermostatic solid-state switch. The results were unsatisfactory for thermostatic switch applications in that the maximum temperature coefficient of resistance obtained was 10 percent per degree centigrade. (Author)

AD-636 921 **Field 9A, 13H, 17B**
CFSTI Prices: HC$3.00 MF$0.75
Delco Radio Div., General Motors Corp., Kokomo, Ind.
PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND INCREASE THE RELIABILITY OF THE SCL7004/21 AND SCL7004/22 TRANSISTORS.
Quarterly progress rept. no. 2, 28 Feb-31 May 66.
by R. P. Anjard. 31 May 66, 80p
Contract DA-36-039-AMC-06170 (E)
See also AD-633 783.

Descriptors: (*Transistors, Quality control), Reliability (Electronics), Manufacturing methods, Failure (Electronics), Radio equipment, Life expectancy.

Identifiers: AN/VRC-12.

There are seven planned equipment and process modifications intended to achieve improved VRC-12 reliability by improved resistance to secondary breakdown. The alloyed boat material is 90% converted in terms of alloy caps and 14% in terms of completed boats. The resultant reduction of entrapped volatiles in the regrowth and the better maintenance of geometry is intended to reduce localized hot spots. The wafer washer, now being used as standard production, eliminates residuals and thereby provides similarly improved alloy junction quality. The alloy furnance study was initiated in this quarter and is intended to compliment the other junction improvement items. The thinner copper base is intended to improve operating capability by reducing thermal resistance. The maximum reliability operating area for the 2N2210 transistor and a detailed analysis of the VRC-12 system was completed. Sustaining voltage tests, pulse energy tests, capacitor effects, clamping of the collector diode by zener diodes, initial efforts to determine collector diode energy capability, the reliability of unusual transistor traces, and the effects of the deletion of the center base contact and dissipation testing was evaluated.

AD-636 938 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Dumont Electron Tubes, Clifton, N. J.
DEVELOPMENT AND FABRICATION OF MINIATURIZED ELECTRONIC IMAGE MAGNIFIER TUBE.
Technical progress rept. no. 19, 1 Apr-31 Apr 66.
by Madison Cawein. 6 May 66, 6p
Contract N123 (62738)50517A (X)
See also AD-636 939.

Descriptors: (*Image tubes, Miniature electron tubes), Manufacturing methods, Performance (Engineering), Electron multipliers, Electron tube parts, Design.

For abstract, see T 66 18.

AD-636 939 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Dumont Electron Tubes, Clifton, N. J.
DEVELOPMENT AND FABRICATION OF MINIATURIZED ELECTRONIC IMAGE MAGNIFIER TUBE.
Technical progress rept. no. 21, 1 Jun-30 Jun 66.
by Joseph Burns. 26 Jul 66, 4p
Contract N123 (62738)50517A (X)
See also AD-636 938.

Descriptors: (*Image tubes, Miniature electron tubes), Manufacturing methods, Performance (Engineering), Electron multipliers, Electron tube parts, Design.

For abstract, see T 66 18.

AD-636 985 **Field 9A, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Midland-Wright, Kansas City, Kans.

CR- (XM-44)/U MODERATE PRECISION GLASS ENCLOSED CRYSTALS.
Quarterly progress rept. nos. 12, 13, and 14, 1 Jan-30 Sep 65.
by Melvin Hammer, and Stuart Radetsky. 30 Sep 65, 36p
Contract DA-36-039-sc-86717

Descriptors: (*Crystal holders, Manufacturing methods), (*Quartz resonators, Manufacturing methods), High frequency, Encapsulation, Glass, Seals, Aging (MaterialS), Quality control.

Identifiers: CR- (XM-44)/U crystal unit, HC-27/U crystal holder.

The frequency measurement system used in the aging test set-up is described. The pre-production samples were rejected due, mainly, to corrosion on the holder pins. Correction of this problem is discussed. The glass sealing technique is described including the equipment and process used, and crystal frequency change due to the heat generated by the seal process. The Inspection and Quality Control Plan is represented by the use of various charts and data forms. (Author)

AD-637 020 **Field 9A, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Raytheon Co., Mountain View, Calif. Semiconductor Operation.
SILICON, PNP, MEXA TRANSISTOR, TYPES 2N328A JAN AND 2N329A JAN.
Quarterly progress rept. no. 1, 29 Nov 65-28 Feb 66.
by Frank Chien, and Sidney Wiesner. 28 Feb 66, 27p
Contract DA-36-039-AMC-06172 (E)
See also AD-636 762.

Descriptors: (*Transistors, Silicon), Manufacturing methods, Reliability (Electronics), Diffusion, Epitoxial growth, Etching, Disks, Diboranes.

A PERT Analysis and Gantt Chart Schedule of the entire program have been prepared and accepted. Required facilities have been obtained, installed, and are now operative. This being the initial progress report, brief descriptions of original processes and the proposed process improvements are presented. Experiments in isolation diffusion and spray etching have been initiated and evaluated by Reliability Assurance. The results are encouraging. (Author)

AD-637 108 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Bliley Electric Co., Erie, Pa.
PRODUCTION ENGINEERING MEASURE. CR-(XM-53)/U, QUARTZ CRYSTAL UNITS.
Quarterly rept. no. 6, Mar-Apr 66.
by J. M. Wolfskill, Merle George, and Robert Mouck. Apr 66, 21p
Contract DA-36-039-AMC-03640 (E)
See also AD-636 802.

Descriptors: (*Quartz resonators, Manufacturing methods), Crystal holders, Glass, Seals, Reliability (Electronics), Performance (Engineering), Fracture (Mechanics), Annealing, Leakage (Fluid).

Identifiers: CR- (XM-53)/U crystal units.

Although sample CR- (XM-53)/U crystal units have been able to meet the stated CR- (XM-53)/U requirements, neither sealing yields nor reliability levels attain the values which are possible. The difficulty has been that cracking and/or leaking of the HC-27 glass holders detracts from the performance of the units. Investigations were made to find methods of reducing these losses, preferably without making changes in the designs of the crystal resonators or the holders. The cracking problem can be alleviated by annealing the units after sealing, but no method yet investigated has been satisfactory for use on the CR- (XM-53)/U. The leaking problem can be minimized by using a penetrant-dye test to detect those HC-27 bases which have defective glass-to-metal seals, even before sealing. Use of this technique has significantly improved both sealing yields and reliability performances.

AD-637 114 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
PRODUCTION ENGINEERING MEASURE FOR SILICON NPN SWITCHING TRANSISTORS.
Quarterly progress rept. no. 2, 25 Aug-25 Nov 65.
by Charles Steinmann, and Jack Freese. 25 Nov 65, 23p
Contract DA-36-039-AMC-06164 (E)
Proj. 26072
See also AD-627 823

Descriptors: (*Transistors, Manufacturing methods), (*Electronic switches, Transistors), Silicon, Photoetching, Doping, Etching, Diffusion, Oxides, Aluminum coating, Assembling, Packaging, Reliability (Electronics), Quality control, Ultrasonic welding.

An increase in basewidth resulted in improved beta and breakdown voltage range control. Diffusion time, temperature, and gas flow variations was studied and show no adverse variation. A change in oxide etching solution and temperature resulted in increased photoresist yields. Test of KMER versus KTFR emulsions have shown KMER to be superior in small pattern processing. The cause of discolored aluminum metallization was traced to the presence of oxygen in the evaporator. Installation of an ultrasonic wire bonder and in-process quality assurance wire bond inspection proved to be valuable in increasing assembly yields. (Author)

N66-10727 **Field 9A**
CFSTI Prices: HC$4.00 MF$1.00
Philips Gloeilampenfabrieken N. V., Eindhoven (Netherlands).
THEORY AND EXPERIMENTS ON THE NOISE OF TRANSISTORS.
Doctoral thesis.
by A. Baelde. 1965, 125p

Descriptors: *Noise, *Recombination, *Generation, *Transistor.

For abstract, see T 66 18.

N66-10901 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.50
Aeronautical Research Council, London (England).
A DISCUSSION OF PITOT-STATIC TUBES AND OF THEIR CALIBRATION FACTORS WITH A DESCRIPTION OF VARIOUS VERSIONS OF A NEW DESIGN.
by D. G. Goodman, C. Salter, and J. H. Warsap. May 62, 51p ARC-RM-3365, ARC-23760
NPL-AERO-1013

Descriptors: *Pitot-static tube.

N66-14610 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
REDUNDANCY IN DIGITAL SYSTEMS.
by F. A. Inskip. Sep 65, 42p RAE-TR-65201

Descriptors: *Integrated circuit, *Redundant system, *Reliability.

N66-14665 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
Southhampton Univ. (England). Dept. of Electronics.
ELECTRONIC CIRCUIT PERFORMANCE USING ANALOGUE TECHNIQUES WITH REFERENCE TO COMPONENT TOLERANCE.
Progress rept Jul. - Dec. 64.
by R. A. Rathmell, and B. H. Venning. 1964, 50p
Contract PD/40/024/R1

Descriptors: *Circuit, *Resistor, *Computer, *Pulse amplitude, *Simulator.

N66-15555 **Field 9A**
CFSTI Prices: HC$4.00 MF$1.00
Physics Lab., RVO-TNO, The Hague (Netherlands). Microwave Dept.
A STUDY ON RECIPROCAL PHASE SHIFTERS USING FERRITES IN C-BAND WAVEGUIDE.
by J. Snieder. Jul 65, 128p

Descriptors: *3C-Band, *Ferrite, *Phase shift, *Waveguide.

N66-15570 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
LITHIUM DRIFTED SEMICONDUCTOR DETECTORS IN NUCLEAR SPECTROSCOPY.
by G. Bertolini, F. Cappellani, W. Fumagalli, M. Henuset, and G. Restelli. Nov 65, 14p EUR-2580.E

Descriptors: *Lithium, *Nuclear spectroscopy, *Radiation detector, *Semiconductor device.

N66-16206 **Field 9A**
CFSTI Prices: HC$7.81 MF$2.50
Pan Technical Systems, Inc., Montrose, Calif.
ELECTRONIC COMPONENT PARTS RELIABILITY EVALUATION TEST - CERAMIC CAPACITORS, TUBULAR AND FLAT.
Final rept.
by H. F. Schoemehl. 17 Sep 65, 481p
Contract NAS7-100
NASA-CR-69903
Prepared in cooperation with Jet Propulsion Lab. California Univ., Pasadena. Contract JPL-951040.

Descriptors: *Ceramics, *Component reliability, *Electronic equipment testing, *Capacitor.

N66-16252 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
Electra Mfg. Co., Independence, Kans.
ACCELERATION FACTOR DETERMINATION FOR METAL FILM RESISTORS.
Quarterly progress rept. no. 1, 1965, 48p
Contract NAS8-11076
NASA-CR-69970

Descriptors: *Metal film, *Noise measurement, *Electronic equipment testing, *Resistor.

N66-16599 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.50
Westinghouse Electric Corp., Youngwood, Pa. Semiconductor Div.
INTEGRATED POWER AMPLIFIER.
Final rept. Mar 64-Sep 65.
by T. C. New. 1965, 58p
Contract NAS8-11599
NASA-CR-70150

Descriptors: *Integrated circuit, *Amplifier design, *Microminiaturized electronic equipment.

N66-16985 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
A STUDY OF THE RELIABILITY OF ELECTRONIC COMPONENTS IN A NUCLEAR-RADIATION ENVIRONMENT.
Quarterly rept. no. 12, 1 Oct-31 Dec 65.

by D. J. Hamman, and C. L. Hanks. 13 Jan 66, 14p
Contract NAS7-100
NASA-CR-70172

Descriptors: *Failure mode, *Gamma radiation, *Neutron irradiation, *Radiation dose, *Semiconductor device.

N66-17076 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
Preston Scientific, Inc., Anaheim, Calif. Test Lab. Div.
CAPACITOR SCREENING EVALUATION TEST PROGRAM.
Final rept.
by S. W. Abe. 17 Nov 65, 79p
Contract NAS7-100
NASA-CR-70303

Descriptors: *Capacitor, *Dielectric material, *Failure mode, *Screen effect, *Test program.

N66-17232 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ENCAPSULATION, ELECTRONICS, ECCOFOAM.
by F. N. LeDoux. Nov 65, 38p NASA-TM-X-55394, X-723-65-450

Descriptors: *Encapsulation, *Polyurethane foam, *Reinforcement, *Sealing, *Electronic equipment.

N66-17341 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
Pan Technical Systems, Inc., Montrose, Calif.
CERAMIC CAPACITOR ACCELERATED LIFE TEST PROGRAM.
Final rept.
3 Dec 65, 38p
Contract NAS7-100
NASA-CR-70382
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech, Pasadena, Contract JPL-951125.

Descriptors: *Ceramics, *Failure mode, *Capacitor, *Spacecraft component.

N66-17479 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
Bendix Corp., Holmdel, N. J. Semiconductor Div.
DESIGN AND DEVELOPMENT OF A 10 NANOSECOND SEMICONDUCTOR SWITCH.
Final rept.
by G. Worchel. 1964, 93p
Contract NAS8-11611
NASA-CR-70460

Descriptors: *Nanosecond, *Semiconductor device, *Switch, *Transistor circuit.

N66-18313 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
FLUID AMPLIFIER DIGITAL INTEGRATOR.
by R. K. Rose. Mar 66, 77p
Contract NAS8-5408
NASA-CR-367

Descriptors: *Differential analyzer, *Digital integrator, *Digital navigation system, *Fluid amplification.

AD-636 441 **See Field 9E**

AD-636 484 **See Field 10B**

AD-636 502 **See Field 20L**

AD-636 560 **See Field 20C**

AD-636 650 **See Field 9E**

AD-636 773 **See Field 9E**

AD-636 790 **See Field 20E**

AD-636 950 **See Field 11B**

AD-637 067 **See Field 13H**

AD-637 081 **See Field 14B**

N66-17706 **See Field 13B**

9B. COMPUTERS

AD-451 231 **Field 9B**
CFSTI Price: HC$3.60
RAND Corp., Santa Monica, Calif.
COMPUTER RECOGNITION OF ON-LINE, HAND-WRITTEN CHARACTERS.
by M. J. Berstein. Oct 64, 34p RM-3753-ARPA
Contract SD-79, ARPA Order-189

Descriptors: (*Character recognition, Input-Output devices), Documentation, Machine translation, Automatic indexing, Digital computers, Programming (Computers).

This Memorandum discusses a method for recognizing single, hand-written characters using an on-line graphical input device, such as a digitizing pantograph, a light pen, or the RAND Graphic Input Tablet, (1) as the primary information source. Basically, the method consists of filtering and smoothing the input stream to eliminate as much redundancy as possible. Direction of the stylus movement is quantized into one of eight directions, allowing each stroke of a character to be described as a series of connected straight-line segments. By eliminating various measures on the stroke, the description is size-, position-, and rotation-independent. In order to restore some rotational orientation and to discriminate between open, closed, and multi-stroke characters, end-point comparisons are added to the description. (Author)

AD-636 314 **Field 9B, 6D**
CFSTI Prices: HC$1.00 MF$0.50
System Research Ltd., Richmond (England).
LEARNING MACHINES.
by Gordon Pask. 1963, 20p
Contract AF 61 (052)-640
Prepared for presentation at Congress of the International Federation of Automatic Control (2nd), Basle, Switzerland, 1963.

Descriptors: (*Learning machines, Theory), Bionics, Probability, Great Britain.

Contents: Machine organization; The mechanism in which learning machines are realized.

AD-636 362 **Field 9B**
Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIGITAL DIFFERENTIAL ANALYZERS WITH ARBITRARY STORED INTERCONNECTIONS.
Revised ed.
by Paul E. Wood Jr. 11 Aug 65, 8p JA-2546
Contract AF 19 (628)-5167
ESD-TR-66-177
Revision of manuscript submitted 22 Mar 65.

Descriptors: (*Digital differential analyzers, *Computer logic), Computers, Design, Operation.

A classification scheme for Digital Differential Analyzers (DDA) structures is presented. Various structures are examined with respect to speed of operation and the case of providing stored interconnections. A class of DDAs with a staggered parallel structure is presented and discussed. The use of this DDA structure together with ultrasonic delay lines allows arbitrary, stored interconnections and DDA operation at approximately analog computer speed and accuracy. Various trades between equipment cost, speed of operation, and the number of integrator units are considered for DDAs in this class. (Author)

AD-636 396 **Field 9B**
CFSTI Prices: HC$4.00 MF$0.75
Research Analysis Corp., McLean, Va.
7040 SIMSCRIPT: A CASE STUDY.
Technical paper.
by Arla E. Weinert, and John R. Bossenga. Feb 66, 121p RAC-TP-196

Descriptors: (*Programming (Computers), *Programming languages), Simulation, Model theory.

Identifiers: SIMSCRIPT, IBM 7040.

A SIMSCRIPT program and a FORTRAN program, both written to implement the same vehicle-dispatching model on the IBM 7040 computer, are compared. Comparisons are made of program structure, requirements for computer storage, computer preprocssing time, computer execution time, and the incorporation of model changes. Appendixes contain information on the use of 7040 SIMSCRIPT. (Author)

AD-636 419 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa.
A DEFINITION OF FORMULA ALGOL.
by Alan J. Perlis, Renato Iturriaga, and Thomas S. Standish. 1966, 53p
Contract SD-146
Prepared in cooperation with National Univ. of Mexico and Instituto Nacional de la Investigacion Cientifica. Presented at the Symposium on Symbolic and Algebraic Manipulation of the Association for Computing Machinery held at Washington, D. C., 29-31 Mar 66.

Descriptors: (*Programming languages, *Mathematical logic), Algorithms, Algebra.

Identifiers: ALGOL.

Formula Algol is an extension to ALGOL 60 incorporating formula manipulation and list processing. This paper defines a current version of the Formula Algol language which is implemented on the CDC G-20. (Author)

AD-636 621 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
BASIC CHARACTERISTICS OF CERTAIN DOMESTIC ELECTRONIC COMPUTERS.
by B. V. Anismov, and V. N. Chetverikov. 23 Feb 66, 29p FTD-MT-66-01
TT-66-61932
Edited machine trans. of mono. Osnovy Teorii i Proektirovaniya Tsifrovykh Vychislitelnykh Mashin, Moscow, 1965 p459-79.

Descriptors: (*Computers, Design), USSR, Equations, Mathematical analysis.

For abstract, see T 66 18.

AD-636 831 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
A DESCRIPTION OF THE BASIC ALGORITHM USED IN THE DETAB/65 PREPROCESSOR.
Professional paper.
by A. E. Chapman, and M. Callahan. 7 Jul 66, 22p SP-2534/000/00

Descriptors: (*Algorithms, *Programming languages), Computer logic, Compliers, Decision theory.

Identifiers: COBOL.

Describes the conversion algorithm used in the DETAB/65 preprocessor, which converts decision tables into COBOL. Since the preprocessor and the language associated with it were developed for COBOL users, the preprocessor was written in a modular form in required COBOL-61. Thus, any COBOL user or any computer can use the preprocessor or easily modify it for his use. (Author)

AD-636 836 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
THE EX-1 SIMULATOR: A PROGRAMMER TRAINING TOOL.
Professional paper.
by Richard A. Brewer. 1 Jul 66, 20p SP-2511

Descriptors: (*Programming (Computers), *Training devices), (*Digital computers, Simulators).

Identifiers: AN/FSQ-32, Time sharing (Computers).

The hypothetical computer called EX-1 is greatly simplified for training purposes. However, it enables the student to program and thus grasp the major concepts involved in programming for a modern high speed digital computer. This training device has proved its worth in many classes, however, the excitement, anticipation, and give and take between programmer and computer have been missing since EX-1 programs could not actually be operated. This drawback has now been removed. Programs written in EX-1 language can actually be run. An EX-1 Simulator has been used with considerable success in programmer training classes for military personnel conducted by SDC at Offutt Air Force Base, Nebraska. (Author)

AD-636 839 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
JOB DESCRIPTIONS AND SCHEDULING IN THE SDC Q-32 TIME-SHARING SYSTEM.
Technical memo.
by Paul V. McIsaac. 10 Jun 66, 31p TM-2996
Contract AF 19 (628)-5166, ARPA Order-773

Descriptors: (*Operations research, *Digital computers), Scheduling, Algorithms, Optimization.

Identifiers: Time sharing (Computers).

This paper describes the current SDC Q-32 Time-Sharing System scheduling algorithm, presents some simulation results and observations which led to its design and implementation, and evaluates the algorithm on the basis of empirical system data. General observations on scheduling are also presented in order to provide insight into the problem and to assist system designers in the development of optimal scheduling algorithms for future time-shared systems. (Author)

AD-636 930 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.75
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
AIR DEFENSE STUDIES (ADS) DIGITAL SYSTEM.
Technical memo.
Feb 66, 73p TG-809
Contract NOw-62-0604

Descriptors: (*Data storage systems, *Digital systems), Analog systems, Maintenance, Instruction manuals, Computers, Circuits.

The technical manual describes the digital system and provides information necessary for maintaining the equipment in an operable state. The ADS system is used for the acquisition and recording of data in the field and for the playback of these data later in the laboratory. The system consists of two equipments: the field equipment and the laboratory equipment. Input data to the field equipment are in analog form. For greatest accuracy in recording these data, they are converted to digital form before they are recorded serially on magnetic tape. Thus the laboratory equipment, which recovers these data from tape, must reconvert them to analog form. The field equipment also recovers and reconverts the data to permit a 'quick-look' evaluation in the field. (Author)

AD-636 976 **Field 9B, 12A**
CFSTI Prices: HC$6.00 MF$1.25
California Univ., Los Angeles. Dept. of Engineering.
STOCHASTIC MODELS OF MULTIPLE AND TIME-SHARED COMPUTER OPERATIONS.
by Edward C. Coffman. Jun 66, 218p Rept. no. 66-38
Contract Nonr-233 (52)

Descriptors: (*Stochastic processes, Digital computers), (*Operations research, *Digital computers), Mathematical models.

Currently, both the hardware and software designs of many large computing systems aim at two basic objectives: improved system performance through exploitation of parallelism in multiprocessor systems, and the provision of improved man-machine interaction primarily through time-shared computer systems. In studying these systems mathematical modeling and analysis constitute an important step towards providing design tools that can be used in building such systems. In the work being described here queueing models of these types of systems are presented and analyzed with the purpose of obtaining conventional performance measures such as the steady-state probability distributions of the number in the system and waiting time in the queue. In particular, a multiprocessor queueing model is devised in which arriving jobs consist of a random number of segments operable in parallel. This model may be viewed as a type of bulk arrival, multiple channel queueing model with exponential service and inter-arrival times. The performance measures mentioned above are obtained and compared with those resulting from other, similar types of computer models in which parallel-processing capabilities are constrained or nonexistent.

AD-636 993 **Field 9B, 5H**
CFSTI Price: HC$2.00
RAND Corp., Santa Monica, Calif.
JOSS: INTRODUCTION TO A HELPFUL ASSISTANT.
by C. L. Baker. Jul 66, 50p RM-5058-PR
Contract AF 49 (638)-1700

Descriptors: (*Computers, *Man-machine systems), Real time, Digital computers, Special purpose computers, Remote control systems, Systems engineering.

Identifiers: JOSS (Johnniac Open Shop System).

A step-by-step demonstration of JOSS--a system designed to provide the individual scientist and engineer with a personal computational service immediately available, whenever required, in his own working environment. The distinguishing features of JOSS are: mobile consoles equipped with electric typewriters for input and output; highly readable and powerful language for numeric computation; English capitalization, spelling, and punctuation rules; easy editing; quick response; exact input; familiar decimal arithmetic; exact output; and report-quality formatted output. The intimate interaction between man and machine permits the JOSS user to exercise judgment continually during the course of computation, changing and modifying the procedure as he wishes. This is one of the unique aspects that distinguishes JOSS from other systems and has led to its enthusiastic adoption by the RAND staff. This talk was presented to the Eleventh Annual Data Processing Conference at the University of Alabama Birmingham Center on 4 May 1966. (Author)

AD-637 000 **Field 9B, 12A**
CFSTI Prices: HC$3.00 MF$0.75
Michigan Univ., Ann Arbor. Communication Sciences Program.
HOMOMORPHISMS OF GRAPHS AND AUTOMATA.
Technical rept.
by Stephen T. Hedetniemi. Jul 66, 93p Rept. no. 03105-44-T
Contract Nonr-1224 (21), Grant DA-ARO (D)-31-124-G665
Projs. 03105, 07363

Descriptors: (*Mathematical logic, *Automata), (*Graphics, *Mapping (Transformations)), Functions, Set theory.

Identifiers: Homomorphisms.

A homomorphism of a graph G onto a graph G' is a function phi from the set of points of G onto the set of points of G' such that whenever two points a and b are adjacent in G, their images, a phi and b phi are adjacent in G'. The concept of a homomorphism of an algebra or of a relational system has been defined and studied for many years, yet the concept of a homomorphism of a graph has not. Although several definitions of graphical homomorphisms have appeared in the literature, not many results have been obtained. In this paper the concept of a homomorphism of a graph is extensively studied. It is shown that the language of graphical homomorphisms is capable of expressing a variety of previously established results in graph theory in such a light as to enable these results to be generalized, proved as corollaries, or proved more simply. It is shown that the concept of a homomorphism of a graph is related to several other concepts in graph theory on the basis of which a number of altogether new results are established. It is also shown that in some cases the usefulness of homomorphisms in solving problems in graph theory is rather limited. The results that are obtained and the questions that are raised in this paper can be said to be either algebraic or graph theoretic in nature. However, an emphasis is placed upon obtaining graph theoretic results. Consequently, there are very few purely algebraic results in this paper; the portions of this work which are algebraic are almost entirely foundational in nature. (Author)

AD-637 007 **Field 9B, 20N**
CFSTI Prices: HC$3.00 MF$0.75
Electronic Associates, Inc., Princeton, N. J. Research and Computation Div.
RESEARCH AND DEVELOPMENT OF ANALOG MODELS.
Interim rept.
by Richard M. D'Addario. 15 Mar 66, 67p
Scientific-1
Contract AF 19 (628)-5043
Proj. AF-8600
AFCRL-66-269

Descriptors: (*Analog computers, *Models (Simulations)), Electromagnetic waves, Propagation, Exosphere, Ionospheric propagation, Curve fitting.

In a program of research and development of analog models for Air Force Cambridge Research Laboratories (AFCRL), the contractor has studied methods for establishing analog models for problems submitted by scientists at AFCRL, and implemented them for solution on the AFCRL analog computer. Seven problems were submitted during the past year in the fields of electromagnetic ray propagation, optical physics, chemical reaction dynamics, and neuroelectrical phenomena. Six of the seven simulations gave significant results to the problem initiators. (Author)

AD-637 010 **Field 9B, 9E**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
SURVEY OF MICROCELLULAR RESEARCH.

by Robert C. Minnick. Jul 66, 70p Scientific-1
Contract AF 19 (628)-5828
Projs. AF-4641, SRI-5876
Task 464101
AFCRL-66-475

Descriptors: (*Computer logic, *Integrated circuits), Semiconductors, Microminiaturization (Electronics), Printed circuits, Manufacturing methods.

Identifiers: Microcellular techniques.

This report is a survey of research on microcellular techniques. Of particular interest are those techniques that are appropriate for realization by modern batch-fabrication processes, since the rapid emergence of reliable and economical batch-fabricated components represents probably the most important current trend in the field of digital circuits. First the manufacturing methods for batch-fabricated components are reviewed, and the advantages to be realized from the application of the principles of cellular logic design are discussed. Also two categorizations of cellular arrays are made in terms of the complexity of each cell (only low-complexity cells are considered in this report), and in terms of the various application areas. After a survey of very early techniques that can be viewed as exemplifying cellular approaches, modern-day cellular arrays are discussed on the basis of whether they are fixed cell-function arrays or variable cell-function arrays. In the fixed cell-function arrays the switching function produced by each cell is fixed; the cell parameters are used only in the modification of the interconnection structure. Several versions of NOR gate arrays, majority gate arrays, adder arrays, and others are reviewed in terms of synthesis techniques and array growth rates. Similarly, the current status of research is summarized in variable cell-function arrays, where not only the interconnection structure, but also the function produced by each cell is determined by parameter selection. (Author)

AD-637 022 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
GRAPHICAL-DATA-PROCESSING RESEARCH STUDY AND EXPERIMENTAL INVESTIGATION.
Quarterly rept. no. 1, 1 Feb-30 Apr 66.
by A. E. Brain, and J. H. Munson. Jul 66, 45p
Contract DA-28-043-AMC-01901 (E)
Projs. DA-1P6.20501.A448.02.45, SRI-5864
ECOM-01901-23

Descriptors: (*Graphics, Data processing systems), Adaptive systems, Learning machines, Pattern recognition, Analog-digital computers, Computer logic.

The hardware, software, techniques, and experience that were developed under the preceding Contract DA 36-039 AMC-03247 (E) are briefly reviewed and are used in assessing the subject matter for further experiments. The criteria given most weight in evaluating the various types of graphical data are that the symbols be hand-drawn, that they be produced by a writing instrument that gives strokes of appreciable width, and that they occur in a situation that requires selective attention and the use of context. They are to appear in a free-field--i.e., a field without boundaries or special reference marks. The subject matter selected was computer coding sheets, where the computer language determines the character set and contextual relationship; the chosen programming language was FORTRAN. A special input system has been built and tested, and some initial results on reading coding sheets are reported. The conclusions that have been drawn regarding preprocessor design from the experiments with the 1024-image preprocessor are briefly summarized; our present position is that we would like to use sample areas covering 0.1% to 1% of the field in our property detectors, and to have at least 10,000 samples. The limitations of the existing preprocessor in relation to the new requirements are discussed and the constants of two possible designs based on multiple cathode-ray tubes and tubes with a fiber-optic faceplate are examined. (Author)

AD-637 061 **Field 9B, 9C**
CFSTI Prices: HC$9.40 MF$2.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SOLVING ENGINEERING PROBLEMS BY DIGITAL COMPUTER.
by B. M. Kagan, and T. M. Ter-Mikaelyan. 15 Mar 66, 637p FTD-TT-65-1148
TT-66-62035
Unedited rough draft trans. of mono. Reshenie Inzhenernykh Zadach na Tsifrovykh Vychislitelnykh Mashynakh, Moscow, 1964 592p.

Descriptors: (*Digital computers, Engineering), (*Programming (Computers), *Engineering), Algorithms, Programming languages, Mathematical programming, Numerical methods and procedures, Functional analysis, Equations, Transients, Boundary value problems, Monte Carlo method, Differential equations, Partial differential equations.

In this book, the authors consider problems of using electronic digital computers (TsVM) engineering calculations and studies. The operating principles are TsVM are presented together with programming fundamentals and methods for solving engineering problems by TsVM. The operator method of programming is presented, and basic information is given on the ALGOL-60 algorithmic language. Methods are considered for TsVM evaluation and investigation of transient processes and stability of dynamic systems as well as engineering problems leading to boundary-value problems for ordinary differential equations and partial differential equations. The fundamentals of the Monte Carlo method are presented together with its principles of application for TsVM studies of control systems and queueing problems. Methods of TsVM solution of linear and nonlinear programming problems are considered. A brief discussion is given of the operating principles of control computers and automatic data processing systems with the special features of programming for these installations. The book is intended for scientific workers, engineers, and graduate students. It may be used by higher-technical school students as a text for the course 'Computers and Programming.' (Author)

AD-637 110 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
HIGHER TECHNICAL SCHOOL. COMPUTER ENGINEERING (SELECTED ARTICLES).
9 May 66, 31p FTD-TT-65-1596
TT-66-62053
Unedited rough draft trans. from Moskovskoe Vysshee Teknicheskoe Uchilishche. Vychislitelnaya Teknika (USSR), v4 p42-8 p53-67 1964.

Descriptors: (*Computers, Engineering), (*Problem solving, Algorithms), (*Analog-to-digital converters, Computer logic), Electrical engineering, USSR.

Contents: One Method of Estimating the Algorithms of a Solvable Problem; Improvement of the Accuracy Characteristics of Analog-Digital Converters.

AD-637 119 **Field 9B**
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE KIEV COMPUTER; A MATHEMATICAL DESCRIPTION.
by V. M. Glushkov, and E. L. Yushchenko. 28 Mar 66, 234p FTD-TT-65-972
TT-66-62056
Unedited rough draft trans. of mono. Vychislitelnaya Mashina Kiev Matematicheskoe Opisanie, Kiev, 1962 p1-183.

Descriptors: (*Digital computers, USSR), Computer logic, Programming (Computers), Electrical engineering, Specifications.

Identifiers: Kiev computers.

This book deals with a description of the general-purpose Kiev computer developed at the VTs AN UkSSR. The book discusses the basis for selection of the mathematical parameters of the computer, a description of the set of operations, standard routines, and test routines, and also discusses problems pertaining to automatic programming, including the special algorithm language developed at the VTs AN UkSSR. The book is designed for engineers, scientific workers, students, and graduate students, working in the field of computer mathematics and computer engineering, as well as for specialists wishing to use electronic computers in their work. (Author)

N66-10595 **Field 9B**
CFSTI Prices: HC$5.00 MF$1.25
Praxis Calcolo, S.P.A., Milan (Italy).
APACHE- ANALOG PROGRAMMING AND CHECKING. PROGRAMMERS MANUAL.
Jun 65, 195p
Contracts EURATOM-026-62-2- CETI, EURATOM-035-64-3 CETI
EUR-2437.E

Descriptors: *Digital computer, *Analog computer, *Computer program, *IBM 7090 computer, *Manual.

For abstract, see T 66 18.

N66-11824 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
Research Inst. of National Defence, Stockholm (Sweden).
A USERS MANUAL FOR SALOMON, AN IBM-7090 CODE FOR GAMMA TRANSPORT CALCULATIONS.
by G. Engstrom. Nov 64, 13p NP-15155

Descriptors: *Transport, *Computer program, *Fortran, *Gamma radiation, *Monte Carlo method.

N66-14074 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. School of Medicine.
D ENDRAL-64 - A SYSTEM FOR COMPUTER CONSTRUCTION, ENUMERATION AND NOTATION OF ORGANIC MOLECULES AS TREE STRUCTURES AND CYCLIC GRAPHS. PART II. TOPOLOGY OF CYCLIC GRAPHS.
Interim rept.
by J. Lederberg. 15 Dec 65, 74p
Grant NsG-81-60
NASA-CR-68898

Descriptors: *Cycling, *Graph, *Computer design, *Tree.

N66-14075 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. School of Medicine.
SYSTEMATICS OF ORGANIC MOLECULES, GRAPH TOPOLOGY AND HAMILTON CIRCUITS. A GENERAL OUTLINE OF THE DENDRAL SYSTEM.
Interim rept.
by J. Lederberg. 12 Jan 66, 37p TR-1040
Grant NsG-81-60
NASA-CR-68899

Descriptors: *Graph, *Topology, *Molecule.

N66-14247 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Maryland Univ., College Park. Computer Science Center.
FORTRAN II TO FORTRAN IV TRANSLATOR UOM SFT FOR THE IBM 7090/7094.
by D. E. Eastlake. Nov 65, 38p TR-65-25
Grant NsG-398
NASA-CR-68462

Descriptors: *Computer program, *Fortran, *IBM 7094 computer, *IBM 7090 computer.

N66-15569 Field 9B
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
A PROGRAM TO RELOCATE AND PACK PROGRAMS IN BINARY FORMAT.
by J. W. Bowman. Nov 65, 20p AECL-2508

Descriptors: *Computer program, *Data storage, *Machine language, *Memory storage unit.

N66-16019 Field 9B
CFSTI Prices: HC$3.00 MF$0.75
Maryland Univ., College Park. Computer Science Center.
SUBROUTINES FOR DIGITAL COMPUTATION OF CHEMICAL ENGINEERING PROBLEMS, PART I.
by C. M. Park. Oct 65, 85p TR-65-24
Grant NsG-398
NASA-CR-69661

Descriptors: *Computer program, *Problem solving, *Subroutine, *Chemical engineering, *Digital technique.

N66-16143 Field 9B
CFSTI Prices: HC$3.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
SAHYB (SIMULATION OF ANALOGUE AND HYBRID COMPUTER) - A GENERAL PURPOSE PROGRAMME FOR THE SOLUTION OF INITIAL AND BOUNDARY VALUE PROBLEMS.
by R. Monterosso, and H. Ohoop. 1965, 59p
EUR-2519.E

Descriptors: *Analog computer, *Boundary value problem, *Computer simulation, *Hybrid computer, *Initial value problem.

N66-16414 Field 9B
CFSTI Prices: HC$6.00 MF$1.50
Sperry Rand Corp., Blue Bell, Pa. Univac Div.
RELIABLE MINIATURE SPACEBORNE MEMORY.
Interim Engineering rpet. 19 Nov 64-26 Jul 65. 1965, 262p
Contrac t NAS5-9518
NASA-CR-69850

Descriptors: *Logic circuit, *Memory storage unit, *Miniature electronic equipment.

N66-16414 Field 9B
CFSTI Prices: HC$6.00 MF$1.50
Sperry Rand Corp., Blue Bell, Pa. Univac Div.
RELIABLE MINIATURE SPACEBORNE MEMORY.
Interim engineering rept. 19 Nov. 64-26 Jul 65. 1965, 262p
Contract NAS5-9518
NASA-CR-69850

Descriptors: *Logic circuit, *Memory storage unit, *Miniature electronic equipment.

N66-16459 Field 9B
CFSTI Prices: HC$3.00 MF$0.50
Maryland Univ., College Park. Computer Science Center.
PATTERN RECOGNITION, V. SAMP-A COMPUTER PROGRAM FOR ESTIMATING SURFACE AREA FROM CONTOUR MAPS.
by M. S. Monmonier, J. L. Pfaltz, and A. Rosenfeld. Aug 65, 52p TR-65-21
Grant NsG-398
NASA-CR-69864

Descriptors: *Fortran, *Cartography, *Computer program, *Pattern recognition, *Surface geometry.

AD-636 311 See Field 5B
AD-636 313 See Field 6D
AD-636 319 See Field 5G
AD-636 322 See Field 6D
AD-636 338 See Field 6P
AD-636 364 See Field 5H
AD-636 380 See Field 5B
AD-636 435 See Field 5B
AD-636 480 See Field 5H
AD-636 495 See Field 20D
AD-636 508 See Field 5G
AD-636 511 See Field 12B
AD-636 539 See Field 5I
AD-636 540 See Field 5I
AD-636 705 See Field 5B
AD-636 738 See Field 12A
AD-636 771 See Field 8C
AD-636 830 See Field 13B
AD-636 840 See Field 5I
AD-636 842 See Field 13G
AD-636 847 See Field 8B
AD-636 913 See Field 6C
AD-636 977 See Field 5B
AD-636 978 See Field 5B
AD-636 988 See Field 5I
AD-637 017 See Field 5B
AD-637 018 See Field 5B
AD-637 019 See Field 5B
AD-637 065 See Field 9D
AD-637 111 See Field 6D
AD-637 123 See Field 12A
NAA-SR-11831 See Field 18K
N66-13246 See Field 18B
N66-16008 See Field 18K
N66-16262 See Field 13H
N66-16498 See Field 18K
N66-16760 See Field 18K
PB-170 961 See Field 5H

9C. ELECTRIC AND ELECTRONIC ENGINEERING

AD-460 579 Field 9C, 17I, 14B
CFSTI Price: HC$4.60
Naval Air Development Center, Johnsville, Pa. Aeronautical Electronic and Electrical Labs.
SPECTRUM ANALYZER MYTHS.
by R. W. Cushman. 15 Feb 65, 47p NADC-EL-6452

Descriptors: (*Spectrum analyzers, Line spectrum), (*Radar equipment, Test sets), Pulse analyzers, Narrowband, Transients, Intermediate frequency amplifiers.

Conventional explanations of spectrum analyzer operation, which are based on mathematical concepts, have led to misconceptions of the physical time domain phenomena involved. This technical note, using a physical approach, describes the transients that pulsed signals produce in spectrum analyzer circuits, and interprets the resulting 'spectrum displays': By using a narrow-band communications receiver, it is shown that 'spectral lines,' as generally conceived, do not exist physically. The displays are shown to be a measure of transient responses of the spectrum analyzer I-F amplifier, rather than indicators of the frequency distribution of a radar transmitter output. Proper interpretation of spectrum analyzer displays as time domain action provides useful information concerning pulsed radar transmitter performance. (Author)

AD-480 134 Field 9C
CFSTI Prices: HC$3.60 MF$0.50
Naval Ordnance Test Station, China Lake, CALIF.
DISCRETE NUMERICAL FILTERS.
by R. J. Stirton. Jan 66, 34p NOTS-TP-3967
ARPA Order-243-61
NAVWEPS-8996

Descriptors: (*Low-pass filters, Functions), Band-pass filter, Errors, Integral transforms, Digital systems, Frequency, Theory.

Low-pass filters using a finite convolution integral representation are discussed. This truncation of the underlying Fourier integrals causes undesirable oscillations in the frequency response of the filter that are suppressed by apodizing functions which smooth the frequency response and do not seriously degrade the sharpness of the cutoff. In this study, the low-pass filter is extended to the bandpass and differentiating filters, and further extension is made to the case of filters for discrete, equally spaced data. An analysis of the error in going from the continuous to the discrete case is presented, and it is shown that this error can easily be kept to less than 1 in 10 to the fourth power. Finally, some examples of filter applications are given. (Author)

AD-636 584 Field 9C
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SOME QUESTIONS CONCERNING THE DYNAMICS OF A PROGRAM CONTROL SYSTEM WITH A REACTION STEP-BY-STEP MOTOR.
by Yu. M. Motrokhin. 21 Mar 66, 9p FTD-TT-65-2046
TT-66-61903
Unedited rough draft trans. of Universitet Druzhby Narodov, Moscow. Trudy (USSR) n2 p90-4 1964.

Descriptors: (*Electric motors, Control systems), Dynamics, USSR, Mathematical analysis, Rotation, Loading (Mechanics).

For abstract, see T 66 18.

AD-636 589 Field 9C, 9E
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A CRITICAL ANALYSIS OF COMPOSITE CONTACTLESS DYNAMIC SYSTEMS.
by Wu Chi-shien. 4 Apr 66, 14p FTD-TT-65-1444
TT-66-61914
Edited trans. of Tzu Tung Hua (Chinese People's Republic) v3 n3 p106-10 1960.

Descriptors: (*Remote control systems, Analysis), Dynamics, Design, China, Digital systems, Analog systems.

The purpose of the paper is to present a critical analysis of design methods for combined point-contactless dynamic systems, with consideration of both structural and synchronization problems. (Author)

AD-636 610 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A DIRECT CURRENT MOTOR WITH NO CONTACTS AND A TRANSISTOR COMMUTATOR.
by N. I. Lebedev, and I. E. Ovchinnikov. 21 Mar 66, 22p FTD-TT-65-2035
TT-66-61921
Unedited rough draft trans. of Sbornik Rabot po Voprosom Elektromekhaniki (USSR) n9 p131-45 1963.

Descriptors: (*Electric motors, Direct current), USSR, Commutators, Semiconductor devices, Transistors, Control systems, Automatic, Power amplifiers, Drives.

This article considers a non-contact dc motor of low power in which the collector is replaced by a transistor commutator controlled by a transformer sensor of the position of the rotor with respect to the stator. The rotor of the motor consists of a 2-pole permanent magnet. The transistor commutator of the motor may be used as a power amplifier. Control of motor speed is easily accomplished by means of modulating the input signals to the commutator. The motor is controlled by signals of low power which makes it possible to use it in automatic control systems without the use of very powerful additional amplifiers and converters. The development of contactless dc motor circuits with a commutator winding utilizing semiconductor elements opens extensive possibilities in the area of creating highly reliable controlled dc drive mechanisms.

N66-10528 **Field 9C**
CFSTI Prices: HC$4.00 MF$0.75
Queens Univ., Kingston (Ontario). Dept. of Electrical Engineering.
ANALYSIS OF A SIMPLIFIED SAMPLED SIGNAL DETECTOR.
by V. C. Hamacher. Mar 65, 112p RR-65-1
Contract DRB-413000

Descriptors: *Background noise, *Phase detector, *Sine wave.

For abstract, see T 66 18.

N66-14249 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Osterreichische Studiengesellschaft fur Atomenergie G.M.B.H., Seibersdorf (Austria). Elektronik Institut.
UNIVIBRATOR AS A TIME BASE ELEMENT IN A MEDIUM FAST COINCIDENCE CIRCUIT.
by H. Halling, and F. May. Sep 65, 18p SGAE-E-5/1965

Descriptors: *Electronic equipment, *Pulse width, *Timing apparatus.

N66-15585 **Field 9C**
CFSTI Prices: HC$3.00 MF$0.75
Georgetown Univ., Washington, D. C. School of Engineering and Applied Science.
REDUNDANCY TECHNIQUES TO IMPROVE THE RELIABILITY OF TWO LEVEL AND THREE LEVEL LOGIC CIRCUITS.
Master's thesis.
by K. Vairavan. Jun 65, 76p
Grant NsG-645
NASA-CR-69428

Descriptors: *Logic circuit, *Circuit reliability, *Redundant system, *Reliability engineering.

N66-16007 **Field 9C**
CFSTI Prices: HC$3.00 MF$0.75
Tokyo Univ. (Japan). Inst. of Industrial Science.
STUDIES ON ELECTRON BEAM NOISE.
by Y. Fujii. Aug 65, 83p

Descriptors: *Electron beam, *Microwave frequency, *Noise measurement, *Photodetector, *Traveling wave tube.

N66-16593 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
AN IMPROVED METHOD FOR MEASURING CURRENT IN HIGH-ENERGY ARC-JET FACILITIES.
by R. T. Hood. 1963, 11p NASA-TM-X-57173

Descriptors: *Hall effect, *Arc jet, *Electric measurement, *Hall generator.

N66-16699 **Field 9C**
CFSTI Prices: HC$3.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Dept. of Electrical Engineering.
COUPLING BETWEEN PARALLEL-PLATE WAVEGUIDES BY WEDGE DIFFRACTION TECHNIQUES.
by R. B. Dybdal, R. C. Rudduck, and L. L. Tsai. 20 Oct 65, 55p Rept. no. 1691-17
Grant NsG-448
NASA-CR-70044

Descriptors: *Wave diffraction, *Waveguide antenna, *Antenna coupler, *Coupling, *Parallel plate.

N66-17896 **Field 9C**
CFSTI Prices: HC$2.00 MF$0.50
Allison Div., General Motors Corp., Indianapolis, Ind.
PHOTOELECTRIC DETECTION OF WEAK SPECTRUM LINES.
by R. T. Schneider, and R. O. Whitaker. Mar 66, 30p
Contract NASw-922
NASA-CR-397

Descriptors: *Digital technique, *Electronic equipment, *Optical spectrum, *Photoelectric photometry, *Spectral line.

PB-170 749 **Field 9C, 9E**
CFSTI Prices: HC$6.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
PREAMPLIFIER MX-2930A, MX-2930B, 162A, 162B, H01-162A, H02-162A, H02-162B (HEWLETT-PACKARD) 1804A-2 (HICKOK).
Technical manual instrument calibration procedure, AA-38.
15 Apr 66, 16p NAVWEPS-17-20AA-38

Descriptors: (*Preamplifiers, Calibration), Instruction manuals, Test methods, Test equipment (Electronics).

The manual describes the calibration of the following dual-trace preamplifier: MX-2930A, MX-2930B, Hewlett-Packard 162A, Hewlett-Packard 162B, Hewlett-Packard H01-162A, Hewlett-Packard H01-162A, Hewlett-Packard H02-162B, Hickok 1804-2.

PB-170 755 **Field 9C**
CFSTI Prices: HC$6.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
SIGNAL GENERATOR SG-117/URM-26B.
Technical manual instrument calibration procedure VG-02.
1 Jun 66, 15p
NAVWEPS-17-20VG-02

Descriptors: (*Signal generators, Calibration), Instruction manuals, Test methods, Test equipment (Electronics).

Identifiers: SG-117/URM-26B signal generator.

The manual describes the calibration of the sg-117/URM-26B signal generator.

AD-636 386 **See Field 20L**

AD-637 024 **See Field 9E**

AD-637 061 **See Field 9B**

9D. INFORMATION THEORY

AD-636 357 **Field 9D**
CFSTI Prices: HC$3.00 MF$0.75
New York Univ., N. Y. Lab. for Electroscience Research.
INVESTIGATION OF THE ERROR-ERASURE CHANNEL.
Technical rept.
by Stephen Dobrow. Mar 66, 59p TR-400-130, Scientific-4
Contract AF 19 (628)-4321
Proj. AF-4610
Task 461003
AFCRL-66-336

Descriptors: (*Decoding, Digital systems), Information theory, Communications systems, Coding, Errors, Corrections.

Several approaches are outlined to the general problem of decoding a digital code word which contains both erasures (nulls) and errors (crossovers). A complementary sequence method is discussed which, for the binary case, reduces the errors-plus-erasures case to that of erasures only, for which a systematic decoding procedure exists. A generalization of this method is also outlined which permits a trade-off between the error-correction and erasure-fill-in capabilities. Some techniques for utilizing the properties of certain special classes of codes in decoding a binary error-erasure channel (BEEC) are also presented. (Author)

AD-636 371 **Field 9D**
Lincoln Lab., Massachusetts Inst. of Tech., Lexington.
OPTIMUM SAMPLING AND QUANTIZING RATES.
by Leonard M. Goodman. 8 Dec 65, 3p JA-2720
Contract AF 19 (628)-5167
ESD-TR-66-194

Descriptors: (*Information theory, *Sampling), Optimization, Coding, Communication systems, Digital systems.

The problem of efficiently encoding analog messages for transmission over a digital communications system is considered. For sampling and quantizing of low-pass signals, an equation which defines the sampling and quantization rates resulting in minimum mean-square error for a fixed transmission rate is derived in terms of the power density spectrum of the source and rate-distortion curve of the quantizer. As an example, we solve for the optimum sampling and quantization rates for the case of the optimum quantizer and a Gaussian random process whose power density spectrum attenuation varies linearly with frequency. For the forementioned case, the resulting sampling and quantizing errors are presented and compared with information theoretic bounds. (Author)

AD-636 399 **Field 9D, 17B**
CFSTI Prices: HC$1.00 MF$0.50
Mitre Corp., Bedford, Mass.
THE COMPUTATION OF CERTAIN COMMUNICATION CHANNEL ERROR PROBABILITIES BY AN APPLICATION OF DIFFERENCE EQUATION METHODS.
Technical rept.

by S. Berkovits, and E. L. Cohen. Jul 66, 25p
MTR-105
Contract AF 19 (628)-5165
Proj. 7560
ESD-TR-66-80

Descriptors: (*Information theory, Errors), (*Mathematical models, *Communication systems), Difference equations, Probability.

A model for a channel is given. For this model, the recursive method is presented in order to calculate the probability of K symbol errors in a block of n m-bit symbols. The blocks can be interleaved or not. (Author)

AD-636 524 **Field 9D**
CFSTI Prices: HC$3.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
ON BOSE-CHAUDHURI-HOCQUENGHEM CODES OVER GF (q).
by Vincent Lum. Jul 66, 59p R-306
Contract DA-28-043-AMC-00073 (E), Grant NSF-GK-690
Proj. DA-20014501B31F

Descriptors: (*Coding, Theory), (*Decoding, Coding), Information theory.

Identifiers: Bose-Chaudhuri-Hocquenghem codes.

Two related aspects of the BCH codes have been investigated. The problems are (1) to have a better knowledge concerning their minimum distances, and (2) to find decoding methods not limited by the BCH bounds. A theory is presented which enables one to determine if a particular BCH code has minimum distance larger than its BCH bound. The derivation of this new theory is based on the Mattson-Solomon approach. The new results are easy to apply as illustrated by several examples. They are applicable to many codes including the well-known Golay (11,6) code over GF (3). A general algebraic full-power decoding method is outlined. In addition, two different methods are presented for the two special cases: (1) the decoding of the two Golay perfect codes to its full error-correcting capability, and (2) the decoding of concactonated codes. All decoding methods are found to be quite practical. (Author)

AD-636 789 **Field 9D, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Utah State Univ., Logan. Electro-Dynamics Labs.
ADAPTIVE SEQUENTIAL DETECTION OF AN UNKNOWN SIGNAL.
Interim rept.
by Craig K. Rushforth. 1 Jun 66, 32p Scientific-6
Contract AF 19 (628)-3825, ARPA Order-450
Proj. AF-8663
AFCRL-66-491

Descriptors: (*Information theory, *Sequential analysis), Adaptive systems, Data processing systems, Signal-to-noise ratio.

This paper treats the problem of sequentially detecting a signal whose amplitude is fixed but initially unknown to the system designer. Under the assumption that the signal is drawn from a Gaussian population with known parameters, the sequential likelihood-ratio detector for detecting the signal in the presence of Gaussian noise is derived. The amount of information per sample provided by this detector is then calculated and compared with that for a detector designed for a specific signal strength. This quantity provides considerable insight into the adaptive capability and the performance of the detector. Finally, the operating characteristic function (OCF) and the average sample number (ASN) are investigated using approximate analytical techniques in conjunction with computer simulation. It is shown that the detector considered in this paper provides considerably more protection against small signals than does a detector designed for a specific signal strength, at the expense of considerably longer average test lengths for such signals. (Author)

AD-637 065 **Field 9D, 9B, 9E**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
POLYTECHNIC INSTITUTE, SCIENTIFIC PAPERS, AUTOMATION: SELECTED ARTICLES.
9 May 66, 35p FTD-TT-65-1089
TT-66-62038
Edited trans. of Politechnika, Breslau. Zeszyty Naukowe (Poland) n85 p43-60, 77-85 1964.

Descriptors: (*Information theory, Telemeter systems), (*Computer logic, Synthesis), Probability, Trigger circuits, Gates (Circuits), Delay circuits, Design, Functional analysis, Poland.

Possibilities of applying information theory to telemetry: The paper defines the fundamental concepts of information theory for telemetric systems. The fundamental problems of statistical methods used in telemetering are discussed. A number of quantities making it possible to formulate information criteria for estimating the quality of telemetering is defined. Synthesis of logic networks containing dynamic triggers: This paper presents an analytical method of synthesizing logic networks on the basis of the state table. The network discussed is a synchronized network and consists of dynamic triggers, OR and AND gates, and correcting delay elements. Examples of designing such networks are given and the functional analysis of the results obtained is made. (Author)

PB-170 819 **Field 9D**
CFSTI Prices: HC$4.00 MF$0.75
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
JOINTLY OPTIMUM WAVEFORMS AND RECEIVERS FOR CHANNELS WITH MEMORY.
by J. C. Hancock, and E. A. Quincy. Apr 66, 88p
Technical rept. TR-EE66-7
Grants NSF-GP-2898, NsG-553

Descriptors: (*Information theory, *Wave functions), Errors, Data transmission systems, Signal-to-noise ratio, Waveform generators, Optimization, Telephone communication systems.

This research considers the problem of finding the jointly optimum set of transmitted waveforms and receiver structure which minimize average probability of error, where errors are due to additive noise and intersymbol interference. The channel characteristics are assumed to be known and time-invariant. The approach used here differs from other investigations of the joint problem in that: (1) the receiver is not restricted to the linear class and (2) the performance criterion is minimum average probability of error. The jointly optimum transmitter and receiver performance is given for: (1) an analytic first-order channel, (2) an experimentally simulated second-order channel and (3) data representing an experimental telephone channel with quadratic delay. The performance of the jointly optimum system for practical channels, such as the telephone channel, is shown to achieve ultimate performance. That is, maximum energy is transferred by the optimum signal while the receiver eliminates the effect of intersymbol interference. (Author)

AD-636 300 **See Field 17B**

AD-636 364 **See Field 5H**

AD-636 592 **See Field 17B**

AD-636 655 **See Field 17B**

AD-636 829 **See Field 17I**

9E. SUBSYSTEMS

AD-437 763 **Field 9E**
CFSTI Price: HC$4.60
RAND Corp., Santa Monica, Calif.
PLANE PHASED ARRAYS: DEPENDENCE OF GAIN ON STEERING, THINNING AND ELEMENT DIRECTIVITY.
by Worthie Doyle. Mar 64, 48p RM-3963-ARPA
Contract SD-79, ARPA Order-189-61
N64-19 560

Descriptors: (*Antenna configurations, Coupled antennas), (*Dipole antennas, Antenna configurations), Gain, Antenna radiation patterns, Polarization, Antenna lobes, Mathematical analysis, Theory.

Two related topics in the design of plane phased arrays are discussed. One is the dependence of gain upon thinning, steering and element directivity; the other is a systematic procedure for locating the elements of highly thinned, plane arrays. A few general observations on the effects of thinning and steering can be made from the expression for the gain of an array of elements having an arbitrary directivity factor. The specializations to isotropic elements and to infinitesimal dipoles are then made and these observations are verified for some actual arrays. A systematic way to randomize element locations in a thinned array while still approximating some basic excitation taper is also suggested and illustrated. The thinning scheme is based on an equal area approximation to a continuous excitation distribution, with the equal areas being laid out in the form of an expanding spiral. This procedure insures against accidental element alignment in any particular direction. Its effectiveness is shown by applying it to a 100-element array and plotting several sections of the resulting directivity pattern. (Author)

AD-470 421 **Field 9E**
CFSTI Prices: HC$3.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
A METHOD OF LOOP GAIN COMPENSATION IN VOLTAGE REGULATING SYSTEMS USED WITH WIDE SPEED RANGE MULTISTAGE GENERATORS.
by R. L. Piper. Feb 65, 37p Technical rept. TR-65015

Descriptors: (*Voltage regulators, Generators), (*Generators, Voltage regulators), Great Britain, Gain, Silicon, Rectifiers, Integrated circuits, Frequency multipliers, Magnetic amplifiers, Semiconductor materials, Functions, Feedback.

The incremental gain of a multistage generator is proportional to the speed raised to the power of the number of stages in the machine. If such a generator is used over a wide speed range large variations of gain will occur. This effect can be compensated in a voltage regulator for use with these machines so that the overall system loop gain is virtually constant, thus giving the same transient load switching performance at all speeds. The report describes the principle applied to the voltage regulation of a two stage brushless d.c. generator giving an output of 28 volts over a speed range of 2 1/2 to 1. (Author)

AD-636 389 **Field 9E, 20I**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Aerophysics Lab.
WIND TUNNEL STUDIES OF ANTENNA BREAKDOWN. PART III: CONTINUATION OF THE SHEATH SIMULATION.
Final technical rept., 15 Jan 63-14 Jan 66.
by Eugene E. Covert, James B. Coffin Jr, and Charles W. Haldeman III. Feb 66, 62p TR-122
Contract AF 19 (628)-2434
Proj. AF-4642
Task 464202
AFCRL-66-265
See also AD-622 270.

Descriptors: (*Antennas, Plasma sheath), (*Antenna radiation patterns, Plasma sheath), (*Plasma sheath, Simulation), Wind tunnels, Plasma physics, Gas flow, Slot antennas, Simulation.

Identifiers: Antenna breakdown.

This report describes the studies that have been carried out to develop a source of electrons in the neighborhood of a body containing a microwave slot antenna for use in a wind tunnel stream for antenna breakdown testing. The electron source is a DC arc plasma that is located within the body. Also described are the tests and improvements of the plasma source that have been undertaken during this report period, and the measurements that were made in the ionized layer using a movable double Langmuir probe assembly. (Author)

AD-636 441 **Field 9E, 9A, 17I, 17B K**
CFSTI Prices: HC$2.00 MF$0.50
Radio Corp. of America, Camden, N. J. Communications Systems Div.
MODULES (INTEGRATED CIRCUITS) FOR COMMUNICATIONS.
Final rept.
by F. E. Farmar, A. M. Hoque, and H. Groot.
Aug 66, 50p
Contract DA-28-043-AMC-0045 (E)
Proj. DA-1P6-22001-A-057
Task 03
ECOM-00454-F
See also AD-631 603.

Descriptors: (*Communication equipment, *Integrated circuits), (*Transponders, Integrated circuits), Analog systems, Linear systems, Logarithmic amplifiers, Intermediate frequency amplifiers, Idenification systems, Radar equipment, Reliability (Electronics), Performance (Engineering), Tuned amplifiers, Delay lines, Video amplifiers.

The application of integrated circuits in analog communications equipment was demonstrated by the development of the IF-video functional assembly of the Mark X IFF Transponder. The IF-video assembly utilizes a linear-logarithmic amplifier technique. Successive detection from each amplifying stage with progressive signal limiting yields output voltage increments proportional to the input voltage ratios. This technique is more readily implemented with state-of-the-art integrated circuits. Various integrated devices were evaluated in typical circuit configurations to select one device to perform all circuit functions (IF amplification and video detection and amplification) for the assembly. The primary design and development criteria considered in this project were cost, performance, reliability and weight. Evaluation of the final assembly demonstrated positive improvements in these criteria over the conventional design. (Author)

AD-636 518 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.75
Airborne Instruments Lab., Deer Park, N. Y.
HF TUNABLE FILTERS.
Final rept.
by Irving Rubinstein, Robert L. Sleven, and David S. Levinson. May 66, 84p Rept. no. 5594-1
Contract AF 30(602)-3558
Proj. AF-4540
Task 454003
RADC-TR-65-525

Descriptors: (*Band-pass filters, High frequency), Tuning devices, Radiofrequency filters, Resonators, Nattowband, Radiofrequency power, Transmission lines.

An investigation to advance the state of the art in narrow-band, high power 2 to 30 Mc filters resulted in the realization of the elliptic-function filter response using transmission-line techniques. An analysis performed on this program showed the elliptic-function filter to be of substantially lower loss than conventional filters with monotonic attenuation band characteristics. Curves were prepared, with the aid of a computer, relating the midband insertion loss to the other response characteristics for the elliptic function filter. Design equations are presented for the transmission-line resonators and coupling structures in the elliptic-function filter. Several experimental filters using helical resonators were constructed and evaluated with the measured results showing close agreement with theory. The lower loss characteristic of the elliptic-function filter as compared with conventional filters was verified experimentally. Various tuning techniques were evaluated and a capacitively tuned experimental model covered a one-octave frequency band with only a small increase in loss due to tuning. (Author)

AD-636 538 **Field 9E**
CFSTI Prices: HC$4.00 MF$0.75
Research Triangle Inst., Durham, N. C. Radiation Systems Lab.
A SURVEY OF AVAILABLE INFORMATION RELATIVE TO ACHIEVING ULTIMATE ANTENNA BANDWIDTHS.
Final technical rept.
by G. V. Borgiotti. 31 Jul 66, 127p RTI-TRR-30
Contract DA-31-124-ARO (D)-396
Projs. DA-2T023201A710, RTI-RU-224
AROD-6030.1 (E)

Descriptors: (*Antennas, Broadband), Reviews, Log periodic antennas, Theory, Dipole antennas, Slot antennas, Antenna radiation patterns, Spiral antennas, Antenna feeds, Performance (Engineering).

This report is concerned with a survey of the presently available literature concerning broadband antennas, in order to determine the capabilities and the limitations of the various techniques which have been investigated. In the first part the present state of the theory of frequency independent antennas is discussed. The experimental work on these structures is then briefly reviewed. In Section II, a parallel treatment is made for log periodic antennas. Section III is mainly concerned with the theoretical question of the bandwidth limitation of an antenna 'small' in terms of wavelength. (Author)

AD-636 546 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.75
Bendix Radio Div., Bendix Corp., Baltimore, Md.
THIN FILM MICROCIRCUIT INTERCONNECTIONS.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 66.
by Harold M. Greenhouse, Robert T. Galla, Theodore H. Yaffe, and Winfield W. Richardson. Jul 66, 67p
Contract DA-28-043-AMC-01482 (E)
Proj. DA-1P6-22001-A-057
Task 03
ECOM-01482-3
See also AD-631 412.

Descriptors: (*Integrated circuits, Circuit interconnections), (*Circuit interconnections, *Metal films), Microminiaturization (Electronics), Vapor plating, Dielectric films, Heat treatment, Chromium, Gold, Aluminum, Tantalum, Silicon compounds, Monoxides, Resistance (Electrical), Aging (Materials), Surface properties, Reliability (Electronics).

Process specifications for the deposition of all the thin films have been finalized. The technique for fabricating tantalum-aluminum films has been changed. AC impedance measurements at 200 MHz indicate that this technique is not as good as DC measurements for the evaluation of interfacial interconnections. Reflectance observations using a time domain reflectometer were negative because of inadequate resolution. Accelerated aging of interfacial interconnections at 240 C and 300 C in air have been run. Aging at 300 C is too rapid for useful correlation with 200 C tests for 1000 hours. Additional power handling characteristics for various interfacial interconnections have been established. The five most promising crossover combinations have been chosen, using a SiO a considerable frequency range. An extension of this method is proposed which seems capable of dielectric thickness of 5000 A. Thermal cycling, accelerated aging and humidity tests have been performed on the various crossover combinations. An automatic breakdown tester has been built and evaluated. Additional adhesion tests have been performed. (Author)

AD-636 650 **Field 9E, 9A, 20C**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
CHANNEL PICTURE AMPLIFIERS.
by V. Jares. 23 May 66, 28p FTD-TT-65-1617
TT-66-61939
Unedited rough draft trans. of Slaboproudy Obzor (Czechoslovakia) v24 n6 p356-63 1963.

Descriptors: (*Video amplifiers, *Electron multipliers), Secondary emission, Electron optics, Television equipment, Czechoslovakia.

In this report the principle of an electron multiple of a picture is given with secondary emission and certain concepts of channel picture amplifiers are given with dynodes from openings in venetian blind, roller and conical arrangement. Also desnel picture amplifiers, developed by the Reseach Inst. of Vacuum Electronics at Prague. (Author)

AD-636 654 **Field 9E, 13H, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE CALCULATION OF AUTOMATIC CONTROL SYSTEMS.
by B. Z. Zilberman. 23 May 66, 19p FTD-TT-65-1852
TT-66-61942
Edited trans. of Avtomatyka (USSR) v9 n5 p3-14 1964.

Descriptors: (*Servomechanisms, Mathematical models), (*Control systems, Automatic), (*Adaptive control systems, Mathematical models), Transients, Feedback, Theory, USSR.

For abstract, see T 66 18.

AD-636 661 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
REALIZATION OF INVARIANCE IN NONLINEAR SERVO SYSTEMS WITH VARIABLE PARAMETERS.
by M. Z. Litvin-Sedoi. 25 May 66, 24p FTD-TT-65-1669
TT-66-61947
Unedited rough draft trans. of mono. Teoriya Invariantnosti v Sistemakh Avtomaticheskogo Upravleniya, n. p. 1964 p126-34.

Descriptors: (*Servomechanisms, Stability), Nonlinear systems, Perturbation theory, Invariance.

For abstract, see T 66 18.

AD-636 754 **Field 9E, 22B**
CFSTI Prices: HC$2.00 MF$0.50
Fairchild Hiller Corp., Bladensburg, Md. Electronics and Information Systems Div.
THIN FILM MICROCIRCUITS FOR ROCKETSONDE.
Quarterly rept. no. 3, 1 Dec 65-28 Feb 66.
by B. J. Patton, and A. Smith. Jun 66, 34p
Contract DA-28-043-AMC-01389 (E)
Proj. 1C0-24401-A-348
Task 00
ECOM-01389-3
See also AD-627 993.

Descriptors: (*Films, Circuits), (*Microminiaturization (Electronics), *Circuits), Tantalum, Tantalum capacitors, Resistors, Radi-

osondes, Sounding rockets, Telemeter systems.

Final resistor load life data are presented showing the differences between the epoxy and acrylic protected and unprotected tantalum thin film resistors. Preliminary studies are reported on the effects of the protective systems on the capacitance, dissipation factor, and DC bias behavior of tantalum thin film capacitors. Results of studies on the rocketsonde r-f circuitry show some temperature instability. Methods for reducing the variation by compensation and frequency-locking are described. (Author)

AD-636 772 **Field 9E, 20F**
CFSTI Prices: HC$2.00 MF$0.50
Varian Associates, Palo Alto, Calif.
INVESTIGATION OF ELECTRONIC INTERACTION WITH OPTICAL RESONATORS FOR MICROWAVE GENERATION AND AMPLIFICATION.
Final rept.
by H. Jory. Jul 66, 46p ER-329-1F
Contract DA-28-043-AMC-00480 (E)
Proj. DA-1G6-22001-A-055-04
ECOM-00480-f
See also AD-629 153.

Descriptors: (*Microwave amplifiers, Resonators), (*Resonators, Optics), (*Millimeter waves, Resonators), Electron beams, Microwave oscillators, Experimental design.

Several interactions are analyzed involving electron beams with novel resonators. The resonators are designed to have dimensions large compared with a free-space wavelength in order that the interactions be suitable for millimeter and submillimeter wave devices. An elliptic-hyperbolic resonator is analyzed and evaluated with the aid of a digital computer. The resonator produces a slow wave which can interact with a linear electron beam, however, the interaction is weak. The interaction between a linear beam and the TM resonances of a confocal mirror system is also investigated. This interaction, although stronger, is not of great interest. The interaction between a rotating beam and a TE sub n11 cylindrical cavity field is analyzed and found to be quite promising for short wavelengths. Interaction parameters are evaluated and the design and partial construction of an experimental device are discussed. (Author)

AD-636 773 **Field 9E, 18H, 9A**
CFSTI Prices: HC$2.00 MF$0.50
Hughes Aircraft Co., Fullerton, Calif.
RADIATION EFFECTS ON (MONOLITHIC) MICROELECTRONIC CIRCUITS.
Quarterly rept. no. 4, 1 Feb-30 Apr 66.
by C. W. Perkins, R. W. Marshall, and A. M. Liebschutz. Jul 66, 28p FR-66-17-148
Contract DA-28-043-AMC-01313 (E)
Task 16.0091
ECOM-01313-4
See also AD-631 705.

Descriptors: (*Microminiaturization (Electronics), *Radiation damage), (*Integrated circuits, Radiation damage), Performance (Engineering), Reduction, Reliability (Electronics), Semiconductor devices, Gates (Circuits), Mathematical prediction.

Preliminary results of the remedial action tests on transient radiation effects show no effect in varying the circuit topology or isolation region configuration, except in the air-ionization leakage effect, which is about 20 percent of the total effect. Gold doping raises the critical radiation thresholds by at most an order of magnitude in going from a concentration of 0 to 3 x 10 to the 16th power atoms/cc. Base-width variations have no effect. Thin-film resistors show a considerably smaller response than do diffused resistors. This could be important in those DTL ON gates which show a response presumably due to base circuit effects including possibly effects in the base circuit resistors. Permanent damage in nomolithic digital circuits is entirely predictable on the basis of known damage effects in transistors. Theoretical expressions for critical radiation thresholds are derived and yield numerical values in excellent agreement with measured values. Since these values fall well above the desired minimum of 10 to the 13th power nvt for all circuits, no remedial action for permanent damage is required under this program. (Author)

AD-636 968 **Field 9E, 4A**
CFSTI Prices: HC$3.00 MF$0.75
Alaska Univ., College. Geophysical Inst.
COLLEGE STEP SOUNDING EQUIPMENT, RECORDING SYSTEMS AND OPERATING PARAMETERS FROM 1963 TO 1965.
Technical rept.
Jul 65, 62p UAG-R-166

Descriptors: (*Atmospheric sounding, *Data processing systems), Electronic recording systems, Photographic recording systems, Transponders, Electromagnetic wave reflections, Ionospheric propagation.

Part I pertains to the expansion of the equipment and program versatility and is of most interest to personnel directly involved in the operation of Granger sounders. The subject matter is discussed in general terms and illustrated with block diagrams which show specific points of connection to the Granger system. Part II describes several data recording devices used at College which are of general interest since they are, in whole or in part, applicable to many types of ionospheric recording equipment. Among the devices described are a variable speed recording camera system, two types of video processors, and an HF transponder unit. All circuits are described in detail with complete block and schematic diagrams, and their effect on the recorded data is considered in detail. As an aid to the scaling and evaluation of the College data, a comprehensive table is included which lists the data recording system and equipment sensitivities for the period October 1963 through March 1965. Part III describes another data recording system which has allowed the addition of amplitude information to the standard ionogram record. This system has been used with the vertical incidence sounder at College and provides supplementary information for the analysis of backscatter and forward oblique records. (Author)

AD-637 024 **Field 9E, 9C**
CFSTI Prices: HC$7.60 MF$0.75
Harvard Univ., Cambridge. Underwater Sound Lab.
MISCELLANEOUS STUDIES IN ELECTRICAL TRANSMISSION NETWORKS.
Completion rept.
by F. Hunt. 15 Nov 45, 76p
Contract OEMsr-287
OSRD-6582

Descriptors: (*Electrical networks, *Phase shift), (*Transformers, Experimental design), Circuits, Transmission lines, Delay lines, Ultrasonic radiation.

This report collects several miscellaneous studies made in support of various apparatus development projects undertaken by the Harvard Underwater Sound Laboratory (HUSL). The first section on networks having linear phase shift brings together some material scattered in the literature and presents new data concerning a bridged-T linear phase-shift circuit which is easy to construct. A standard lag line is described which has proved to be useful in phase-shift determinations in the ultrasonic frequency range. Another application of linear phase-shift networks is presented in connection with artificial lines utilized for the production of short pulses. Although only limited experimentation was devoted to these pulse-forming networks, they appear to have a promising future and recommendations are made concerning their design. The first part of the report concludes with discussion of an unpublished method of producing two signals differing in phase by 90 degrees over a considerable frequency range. An extension of this method is proposed which seems capable of improving materially the accuracy of the quadrature phasing. The second part of the report deals with considerations in transformer design for ultrasonic frequencies. Portions of this treatment are not novel, but it has proved valuable to have available a coherent presentation of the whole design problem for wide-band untuned transformers.

PB-169 948 **Field 9E, 1E, 17B**
CFSTI Prices: HC$3.00 MF$0.75
National Aviation Facilities Experimental Center, Atlantic City, N. J.
EVALUATION OF VHF AND UHF ANTENNA ASSEMBLIES FA-5526, FA-5527, FA-5528.
Final rept.
by Floyd F. Jones. Dec 65, 83p
Projs. 221-150-05V, 221-150-06V
SRDS-RD-65-134

Descriptors: (*Antennas, Tests), (*Dipole antennas, Tests), (*Terminal flight facilities, Antennas), Antenna radiation patterns, Very high frequency, Ultra high frequency, Performance (Engineering), Standing wave ratios, Antenna arrays, Landings, Take-off, Radio communication systems, Broadband, Ice prevention.

An evaluation of developmental models of VHF Antenna Assemblies FA-5526, FA-5527, and UHF Antenna Assembly FA-5528, was conducted to determine their performance characteristics, capabilities, and limitations for utilization in future developmental efforts. The evaluation included the accomplishment of antenna range and flight radiation patterns for each type of antenna, measurements of voltage standing wave ratios, intercoupling measurements between antennas when installed in a hexagonal configuration, and signal intensities received during light aircraft operations, while landing and taking off at airports ranging from eight to fifty-one miles from the antenna test site. It was concluded that, although the FA-5526, FA-5527 and FA-5528 Antenna Assemblies provided adequate overhead coverage, and acceptable isolation between antennas installed in a hexagonal configuration, the large size of the antenna assemblies, initial cost, weight, installation requirements, and siting effect on low angle coverage, reduced the desirability of the antennas for operational application. (Author)

AD-476 369 See Field 9A
AD-636 381 See Field 20F
AD-636 481 See Field 9A
AD-636 563 See Field 20E
AD-636 589 See Field 9C
AD-636 642 See Field 20E
AD-636 933 See Field 20N
AD-636 956 See Field 20I
AD-636 999 See Field 4A
AD-637 010 See Field 9B
AD-637 065 See Field 9D
PB-170 749 See Field 9C

9F. TELEMETRY

AD-637 008 **Field 9F, 4B**
CFSTI Prices: HC$2.00 MF$0.50
Friez Instrument Div., Bendix Corp., Baltimore, Md.
DEVELOPMENT OF A HELICAL ANTENNA FOR THE AN/DMQ-9 ROCKETSONDE.
Final scientific rept., Dec 65-May 66.
by Kenneth W. Kidd. Jun 66, 29p EIR-698

Contract AF 19 (628)-5807
Proj. AF-6682
Task 668203
AFCRL-66-470

Descriptors: (*Helical antennas, *Telemetering antennas), Sounding rockets, Telemeter systems, Meteorological instruments, Upper atmosphere, Reliability (Electronics).

Identifiers: AN/DMQ-9.

The AN/DMQ-9 rocketsonde is an expendable meteorological instrument package designed for use with the Arcas rocket vehicle to obtain vertical profiles of temperature and winds in the upper atmosphere between 80,000 feet and 200,000 feet. The instrument is of the transponder type and is compatible with the AN/GMD-2 Rawin Set ground equipment. The purpose of this effort was to develop a helical antenna for the rocketsonde transmitter to improve the reliability of the r.f. transmission link. Flight tests conducted at the Air Force Eastern Test Range, Cape Kennedy, Florida indicate the objective of the program was met. (Author)

N66-14223 **Field 9F**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A STUDY OF THE JPL MARK I RANGING SUBSYSTEM.
by S. Levine, H. W. Shaffer, M. L. Spafford, and R. T. Tagler. Nov 65, 104p NASA-TM-X-55346, X-531-65-467

Descriptors: *Deep space instrumentation facility, *Distance measuring equipment, *Range measurement.

For abstract, see T 66 18.

N66-16226 **Field 9F**
CFSTI Prices: HC$7.66 MF$2.25
Chrysler Corp., Huntsville, Ala.
SATURN ANTENNA SYSTEMS SA-5, VOLUME I.
by T. B. Hickman. 18 Jun 63, 466p
Contract NAS8-4016
NASA-CR-69711

Descriptors: *Radiation field, *Antenna field, *Minitrack, *Saturn I (SA-5), Launch vehicle, *Telemetry, *Very high frequency radio equipment.

N66-17093 **Field 9F**
CFSTI Prices: HC$4.00 MF$1.00
Illinois Univ., Urbana. Coordinated Science Lab.
HIGH RESOLUTION RADIO FREQUENCY MEASUREMENTS OF FARADAY ROTATION AND DIFFERENTIAL ABSORPTION WITH ROCKET PROBES.
by J. Gooch, B. Kirkwood, H. Knoebel, H. Krone, and D. Skaperdas. Dec 65, 147p R-273
Contract DA-28-043-AMC-00073 (E), Grant NsG-504
NASA-CR-70319

Descriptors: *Faraday rotation, *Frequency measurement, *Ionospheric absorption, *Radio frequency, *Rocket measurement.

N66-18067 **Field 9F**
CFSTI Prices: HC$2.00 MF$0.50
Auburn Research Foundation, Inc., Ala. Antenna Research Lab.
THE DESIGN, CONSTRUCTION AND EVALUATION OF AN ELLIPTICALLY POLARIZED ANTENNA ELEMENT.
Technical rept. no. 2.
by H. M. Summer. 18 Dec 64, 48p
Contract NAS8-11251
NASA-CR-70528

Descriptors: *Electric dipole, *Electromagnetic field, *Radio direction finder, *Dipole antenna, *Magnetic dipole.

N66-18087 **Field 9F**
CFSTI Prices: HC$3.00 MF$0.75
Auburn Research Foundation, Inc., Ala. Antenna Research Lab.
THE DESIGN, CONSTRUCTION AND EVALUATION OF A CROSSED-SLOT, CAVITY BACKED ANTENNA.
Technical rept. no. 3.
by H. M. Summer. 19 Apr 65, 89p
Contract NAS8-11251
NASA-CR-70529

Descriptors: *Radiation, *Resonant cavity, *Slot antenna, *Tracking antenna.

N66-18413 **Field 9F**
CFSTI Prices: HC$3.00 MF$0.75
Auburn Univ., Ala. Antenna Research Lab.
A PROPOSAL FOR A CIRCULARY POLARIZED TRACKING ANTENNA AND ITS EVALUATION.
Technical rept. no. 1.
by R. J. Coleman, E. R. Graf, and S. B. Roberts. 24 Jun 64, 72p
Contract NAS8-11251
NASA-CR-70515

Descriptors: *Tracking antenna, *Aircraft guidance, *Circular polarization.

AD-636 655 **See Field 17B**

10A. CONVERSION TECHNIQUES

N66-14218 **Field 10A**
CFSTI Prices: HC$3.00 MF$0.75
Clevite Corp., Cleveland, Ohio. Electronic Research Div.
DEVELOPMENT OF CADMIUM SULFIDE THIN FILM PHOTOVOLTAIC CELLS.
Final rept.
by F. Augustine, W. K. Bower, J. R. Hietanen, and F. A. Shirland. 15 Nov 65, 65p
Contract NAS3-6461
NASA-CR-54806

Descriptors: *Cadmium sulfide.

N66-16693 **Field 10A**
CFSTI Prices: HC$4.00 MF$0.75
Electro-Optical Systems, Inc., Pasadena, Calif.
ANALYSIS OF POTENTIAL SECONDARY EXPERIMENTS FOR A SOLAR-THERMIONIC FLIGHT TEST VEHICLE. VOLUME III. ENGINEERING EXPERIMENTS CATALOG.
Final rept. 14 May-15 Oct 65.
19 Nov 65, 151p EOS-6961-Vol-3
Contract NAS7-100
NASA-CR-70048

Descriptors: *Aeronautical engineering, *Engineering development, *Experiment design, *Solar power system.

N66-16930 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
OPTIMIZATION OF HEAT PIPE THERMIONIC CONVERTERS FOR SPACE POWER SUPPLIES.
by C. A. Busse. 1965, 20p EUR-2534.E

Descriptors: *Optimization, *Thermionic converter, *Energy conversion, *Heat transfer, *Power supply.

N66-17229 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE MEASUREMENT AND APPLICATION OF THE QUANTUM YIELD OF SOLAR CELLS USING A FILTER TECHNIQUE.
by D. J. Gallagher, and W. G. Gdula. Sep 65, 24p NASA-TM-X-55372, X-713-65-372

Descriptors: *Solar cell, *Optical filter.

N66-17236 **Field 10A**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THERMAL ANNEALING OF RADIATION DAMAGE IN SOLAR CELLS.
by P. H. Fang. Nov 65, 103p NASA-TM-X-53399, X-713-65-468

Descriptors: *Annealing, *Proton irradiation, *Radiation effect, *Silicon solar cell, *Electron radiation, *Thermal effect.

N66-17346 **Field 10A**
CFSTI Prices: HC$4.00 MF$1.00
Pennsylvania Univ., Philadelphia. Power Information Center.
PROCEEDINGS OF THE FIFTH PHOTOVOLTAIC SPECIALISTS CONFERENCE. VOLUME III-SOLAR POWER SYSTEM CONSIDERATIONS.
Jan 66, 145p PIC-SOL-209/6.2
Contract NASr-191
NASA-CR-70170
Presented at Conf. held at NASA, Goddard Space Flight Center, Greenbelt, Md., Oct 20, 1965. Prepared for Interagency Advanced Power Group.

Descriptors: *Conference, *Photovoltaic effect, *Power supply, *Solar cell.

AD-636 484 **See Field 10B**

AD-636 936 **See Field 18E**

10B. POWER SOURCES

AD-636 425 **Field 10B, 20I**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile and Space Div.
ELECTRICAL CHARACTERISTICS AND LOSS MECHANISMS OF A NON-EQUILIBRIUM LINEAR MHD GENERATOR.
Technical information series.
by Bert Zauderer. Jul 66, 20p R66SD26
Contract Nonr-3867 (00)
Proj. NR-099-371
Prepared for presentation at International Symposium on MHD Power Generation (3rd), Salzburg, Austria, July 1966.

Descriptors: (*Magnetohydrodynamic generators, Electrical properties), Hall effect, Leakage (Electrical), Plasma medium, Xenon, Gas flow, Stability, Ionization, Chemical equilibrium.

The purpose of the experiments was to determine the electrical characteristics of the non-equilibrium, linear MHD generator and to isolate the causes of the Hall potential losses in the generator. The generator working fluid was atmospheric pressure xenon, with a conductivity range of 100 to 800 Mhos/m and a Hall parameter range of 3 to 11. With the generator operating in the equilibrium mode, the measured voltage-current characteristics were in agreement with the uniform MHD generator theory. In the presence of non-equilibrium ionization the Hall voltage and the Faraday generator load characteristics were up to a factor of two below the theoretical values. The cause of this reduction was attributed to gas dynamic flow disturbances, Lorentz forces and non-uniform non-equilibrium ionization. All of these effects reduced the Hall potential and the transverse current level. (Author)

AD-636 436 **Field 10B, 17G, 13J**
CFSTI Prices: HC$1.00 MF$0.50
Westinghouse Electric Corp., Lia, Ohio. Aerospace Electrical Div.

100 WATT THERMOELECTRIC POWER SYSTEM FOR BUOY APPLICATIONS.
Monthly progress rept. no. 23, 11 Apr-11 May 66.
by Dale A. Naumer. 11 May 66, 4p
Contract N600 (61533)61992
See also AD-635 676.

Descriptors: (*Thermoelectricity, Buoys), (*Buoys, Power supplies), Electric power production, Generators, Performance (Engineering), Thermocouples, Temperature, Environmental tests.

On April 15, 1966 the burner was started on the first T/E generator system for the oceanographic buoy application. During the reporting period 373 hours of operation were accumulated and all of the basic generator calibrations were accomplished. A simulated buoy environment of 95F water and 110F air was used during these calibrations and the generator performed as designed with no measurable deterioration. The maximum power point measured to date is shown in the volt-ampere and power curve. The average measured temperature for this data point is given. The generator is now being connected into the simulated buoy system including the primary and secondary batteries, the control, the ignitor voltage regulator plus the connecting harness assembly. The remainder of the testing on this unit will be as a battery charging system and will include simulating cold ambient operation.

AD-636 483 **Field 10B, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
POTENTIAL OF A PLATINUM ELECTRODE AT LOW PARTIAL PRESSURES OF HYDROGEN AND OXYGEN. PART II. AN IMPROVED GAS-TIGHT SYSTEM WITH A NEGLIGIBLE OXYGEN LEAK.
Interim rept.
by S. Schuldiner, B. J. Piersma, and T. B. Warner. 20 Jun 66, 11p NRL-6411-Pt-2
Projs. SR-007-12-01-0809, RR-001-01-43-4754

Descriptors: (*Electrodes, *Platinum), (*Fuel cells, Electrodes), Oxygen, Hydrogen, Pressure, Chemical equilibrium, Thermodynamics, Electrochemistry, Purification.

A tight electrochemical system was constructed in which the O2 pressure (PO2) above the cell solution was less than 10 to the 9th power atm. A comparison of the potentials obtained with this system with data from AD-624 024 shows that very small amounts of O2 leaking into a closed system can have marked effects on potential behavior at low H2 pressures (PH2). Reduction of the O2 leak to negligible proportions showed that: (a) the Nernst equilibrium relation for the H (+)/H2 couple holds only for PH2 in excess of 0.000001 atm; (b) at PH2 less than 0.000001 atm, trace amounts of O2 even in the presence of several orders of magnitude more H2, acted as an electrode poison, causing a positive deviation from the theoretical Nernst behavior; (c) in O2-free solution, at PH2 below 0.000001 atm, the potential remained at 0.18 v positive to the normal hydrogen electrode (N.H.E.) and was independent of PH2. The potential-determining reaction in this region may be an exchange of H (+) in solution with H atoms dermasorbed in the Pt. The potential vs O2 partial pressure relation was essentially the same as found in previous work at this Laboratory. Residual hydrogen associated with Pt at potentials from 0.18 to 0.20 v did not react with oxygen. (Author)

AD-636 484 **Field 10B, 10A, 9A**
CFSTI Prices: HC$5.00 MF$1.00
GM Defense Research Labs., Santa Barbara, Calif. Land Operations Dept.
ENGINEERING INVESTIGATION OF A THERMOPHOTOVOLTAIC ENERGY CONVERTER.
Final technical rept., 23 Dec 64-3 May 66.
by Roger W. Haushalter. Jun 66, 192p TR-66-26
Contract DA-44-009-AMC-622 (T)

Descriptors: (*Thermoelectricity, Generators), (*Photoelectric cells (Semiconductor), *Energy conversion), Electric power production, Power supplies, Mathematical analysis, Performance (Engineering), Cooling + ventilating equipment.

Identifiers: Thermophotovoltaic converters.

Work described in this report consists of studies of lightweight, portable, aircooled thermophotovoltaic (TPV) energy conversion systems to determine the feasibility of developing such systems to meet six specific army applications. The specific applications are for operation at 125F ambient temperature and delivery of: 300 watt net power at a system weight of 35 lb with and without fuel, 500 watt net power at a system weight of 35 lb with and without fuel, 3,000 watt at system weights of 100 and 150 lb, each without fuel. A mathematical analysis, programed for computation with a digital computer, was made of a TPV system. By use of the program, best values were determined for the system component parameters, and the photovoltaic devices required to meet the desired system specifications were defined. External reflective filters for use in combination with absorptive photovoltaic devices were designed, procured, and optically evaluated independently and as mounted on photocells. Studies were also carried out with respect to photocell temperature sensitivity, theoretically limited and practically achievable photovoltaic device performance, and cell design and fabrication. The results of the analytical and experimental studies indicate that it is not possible, within the foreseeable state of the art, to develop photovoltaic energy converters which meet the desired specifications. A derated version of the 300 watt system, however, might be possible. (Author)

AD-636 506 **Field 10B, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
ION-EXCHANGE MEMBRANES: COMPILATION OF ABSTRACTS.
ATD work assignment no. 90.
by Frederick V. Pindy. 18 Apr 66, 31p ATD-66-39
TT-66-61898
Based on Soviet open sources pub. 1964-65. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Fuel cells, Ion exchange), (*Ion exchange, Membranes), Reviess, Abstracts, Scientific organizations, Ion exchange resins, Electrochemistry, Catalysis, Thermodynamics, Radiation damage, USSR.

The abstracts are arranged according to the institution under whose auspices the work was conducted. Following the Introduction the report is divided into six sections: I. Leningrad State University (16 entries); II. Belorussian State University (Institute of General and Inorganic Chemistry) (8 entries); III. Institute of Physical Chemistry (4 entries); IV. Institute of High-Molecular Compounds (3 entries); V. Institute of Electrochemistry (2 entries); VI. Other Institutions (10 entries); VII. Patents (3 entries). Work on ion exchange membranes is being conducted primarily at five centers--those listed above. Other institutions are doing some work in this field, and occasional patents deal with devices and methods used in ion exchange membranes. Owing to the paucity of information on ion exchange membranes in fuel cell applications, it was necessary to make the selection of articles for this report on a more general basis. It is noted that Soviet planners have assigned a rather high priority to fuel cell technology and goes on to discuss progress made on fuel cell technology and related subjects in the past 3-4 years. Confirmation that restrictions might have been imposed on the publication of certain types of information concerning fuel cells and related fields is pointed out on the basis of remarks in a review article by a Soviet author and also the scanty number of articles on the subject of fuel cells in a new monthly 'Elektrokhimiya'. (Author)

AD-636 656 **Field 10B, 20**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
MAGNETO-HYDRODYNAMIC GENERATORS OF THE HALL TYPE.
by L. Rothhardt. 25 May 66, 14p FTD-TT-65-1825
TT-66-61944
Unedited rough draft trans. of Beitrage aus der Plasmaphysik (Germany) v4 n1 p33-9 1964.

Descriptors: (*Magnetohydrodynamic generators, Hall effect), Operation, Magnetohydrodynamics, Partial differential equations.

Three types of generators in which the Hall effect essentially determines the operational method are discussed.

AD-636 915 **Field 10B, 13J**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Ships, Washington, D. C.
MARINE ELECTRIC PLANTS AND CALCULATION OF THEIR POWER.
by V. A. Panov. Jul 66, 96p Buships-Trans-992
TT-66-62016
Trans. of mono. Sudovye Elektrostantsii i Raschet ich Moshchnosti, Leningrad, 1965 129p.

Descriptors: (*Auxiliary power plants, Ships), USSR, Diesel engines, Turbines, Generators, Panel boards (Electrical), Electrical engineering, Mathematical analysis, Operation.

Summary. A review is made of certain problems involved in the planning of modern ships' electric plants and the individual units of the circuits in the principal distributing installations are described. Specific attention is diverted to the questions of the calculation and selection of the power of subassemblies at the electric plants; analyses are made of the operating conditions of individual ship power users and of electric plants on various types of vessels. The author analyzes the tabular method of calculation now in use and he discusses a method for estimating the power of vessel electric plants developed on the basis of experimental and statistical material, including the application of elements from the theory of probability and of mathematical statistics. (Author)

AD-636 954 **Field 10B, 20L, 11B**
CFSTI Prices: HC$2.00 MF$0.50
Northeastern Univ., Boston, Mass.
LITERATURE SURVEY ON THE SURFACE STRUCTURES OF REFRACTORY METALS WITH REFERENCE TO THE THERMIONIC EMISSION AND ENERGY CONVERTERS.
by Welville B. Nowak, and Jacob Babakian. Jun 66, 48p Scientific-5
Contract AF 19 (628)-3836
Proj. AF-8659
Tasks 865901, 865902
AFCRL-66-362

Descriptors: (*Energy conversion, Refractory metals), (*Refractory metals, *Thermionic emission), (*Reviews, *Crystal structure), Surface properties, Work functions, Anodes, Cathodes.

The thermionic converter directly transforms heat into electricity. The conversion efficiency of these devices is maximized when the emitter and collector surfaces have optimum work functions that are uniform over the surfaces. This implies a surface consisting of a single type of crystallographic plane. A review of the literature has been made with respect to the surface structures of the refractory metals and the treatments producing these structures. There is direct evidence that single crystals, properly treated, and that well-oriented, properly-treated polycrystalline material can provide surfaces with relatively uniform work func-

tions. There is reason to believe that, with suitable chemi-thermal treatments and induced material transport, one could produce a uniform work function surface on randomly oriented, polycrystalline material. (Author)

GIC-3362-4 **Field 10B, 20L**
CFSTI Prices: HC$3.00 MF$0.75
General Instrument Corp., Newark, N. J. Thermoelectric Div.
THERMOELECTRIC BISMUTH TELLURIDE IMPROVEMENT PROGRAM.
Final rept.
1965, 74p
Contract AT (30-1)-3362

Descriptors: (*Bismuth compounds, Tellurides), (*Thermoelectricity, Bismuth compounds).

For abstract, see N 20 16.

N66-15812 **Field 10B**
CFSTI Prices: HC$5.00 MF$1.00
Thermo Electron Engineering Corp., Waltham, Mass.
FINAL DESIGN DOCUMENTATION FOR SIX-CONVERTER THERMIONIC GENERATOR DESIGN.
by P. J. Brosens. Oct 65, 176p TE-18-66
Contract NAS7-100
NASA-CR-69567

Descriptors: *Energy converter, *Solar heat flow, *Power generator, *Structural design, *Thermionic conversion system.

N66-16447 **Field 10B**
CFSTI Prices: HC$4.00 MF$1.25
Radio Corp. of America, Lancaster, Pa. Electron Tube Div.
THE DEVELOPMENT OF A CESIUM-VAPOR-FILLED THERMIONIC ENERGY CONVERTER.
Final technical rept.
by G. Y. Eastman, and D. M. Ernst. Dec 62, 182p
Contract NAS7-100
NASA-CR-69861
Prepared in cooperation with Jet Propulsion Lab., California Inst. of Tech., Pasadena, contract no. JPL-950229.

Descriptors: *Cesium vapor, *Energy converter, *Solar power system, *Thermionic converter.

N66-16465 **Field 10B**
CFSTI Prices: HC$4.00 MF$0.75
Goodyear Aerospace Corp., Akron, Ohio.
CONE AND COLUMN SOLAR CONCENTRATOR MODEL.
Final rept.
by T. J. McCusker. Jul 65, 110p GER-12268
Contract NAS1-4341
NASA-CR-66012

Descriptors: *Concentrator, *Power generator, *Energy converter, *Optical generator, *Solar collector.

N66-17325 **Field 10B**
CFSTI Prices: HC$3.00 MF$0.75
Airesearch Mfg. Co., Los Angeles, Calif.
PARAMETRIC DESIGN STUDY - RECUPERATOR DEVELOPMENT PROGRAM, SOLAR BRAYTON CYCLE SYSTEM.
by A. F. Anderson, and S. F. Felszeghy. 10 Mar 64, 78p L-9372
Contract NAS3-2793
NASA-CR-70381

Descriptors: *Brayton cycle, *Closed cycle, *Heat exchanger, *Solar energy.

AD-636 384 **See Field 7D**

AD-636 496 **See Field 8J**

AD-636 560 **See Field 20C**

10C. ENERGY STORAGE

AD-636 537 **Field 10C**
CFSTI Prices: HC$2.00 MF$0.50
Mallory Battery Co., Tarrytown, N. Y.
TESTING AND EVALUATION OF PRIMARY ALKALINE CELLS AND BATTERIES.
Interim rept. no. 9, 31 Jul 64-30 Apr 65.
by Roger Goodman. 30 Apr 65, 33p
Contract DA-36-039-sc-78320 (E)
Task 1C6-22001-A-053-02
See also AD-460 578.

Descriptors: (*Alkaline cells, Primary cells), Batteries + components, Zinc, Mercury compounds, Oxides, Temperature, Experimental data, Storage, Electric discharges, Performance (Engineering), Voltage.

The testing and evaluation of primary alkaline cells of the zinc-alkaline-mercuric oxide system over a wide range of temperature, discharge and storage is presented. (Author)

N66-15794 **Field 10C**
CFSTI Prices: HC$2.00 MF$0.50
Leesona Moos Labs. Div., Leesona Corp., Great Neck, N. Y.
THE IMPROVEMENT OF ZINC ELECTRODES FOR ELECTROCHEMICAL CELLS.
by J. E. Oxley. Feb 66, 37p
Contract NAS5-3908
NASA-CR-377

Descriptors: *Silver-zinc battery, *Storage battery.

For abstract, see T 66 18.

AD-467 100 **See Field 7D**

AD-637 081 **See Field 14B**

11A. ADHESIVES AND SEALS

AD-636 712 **See Field 6L**

11B. CERAMICS, REFRACTORIES, AND GLASSES

AD-636 808 **Field 11B, 20M, 7D**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE THERMODYNAMICS OF THE ALUMINA/ALUMINUM-OXYGEN VAPOR SYSTEM.
by F. J. Krieger. Jun 66, 35p RM-5042-PR
Contract AF 49 (638)-1700

Descriptors: (*Ablation, Aluminum compounds), (*Aluminum compounds, Oxides), (*Aluminum, Thermodynamics), (*Oxygen, Thermodynamics), Phase studies, Thermochemistry, Chemical equilibrium, Temperature, Pressure, Enthalpy, Entropy, Density.

Identifiers: Aluminum oxides.

The purpose of this study is the thermodynamic investigation of alumina, A1203, over a range of temperatures up to 6000K and pressures up to 1000 atmospheres. Two sets of equilibrium composition equations are used--one representing a pure gas phase, the other a heterogeneous system of gas and condensed (i.e., solid or liquid) alumina. The gas phase of the heterogeneous chemical system, like the homogeneous gas phase, comprises 12 gaseous aluminum-oxygen species. The results of the computational program are presented in both tabular and graphic form. The latter is a conventional Mollier diagram in which specific enthalpy is plotted against specific entropy, with cross plots of temperature, pressure, and molecular weight or moles of condensed alumina. (Author)

AD-636 950 **Field 11B, 9A**
CFSTI Prices: HC$8.00 MF$2.25
EIMAC, San Carlos, Calif.
METALLURGICAL RESEARCH AND DEVELOPMENT FOR CERAMIC ELECTRON DEVICES.
Rept. no. 12 (final) 1 Jul 62-30 Jun 65.
by L. Reed, W. Wade, S. Vogel, R. McRae, and C. Barnes. Jan 66, 494p TR-66-1, R/E-66-115
Contract DA-36-039-sc-90903
See also AD-453 867.

Descriptors: (*Seals, Ceramic materials), (*Metal seals, Electronic equipment), (*Microwave equipment, Seals), Aluminum compounds, Oxides, Dielectric properties, Paints, Beryllium compounds, Quartz, Electrical properties, Radiofrequency power, Waveguide windows, Electron tubes.

Identifiers: Defender project.

Fifteen special 94% and 99% alumina ceramics in the system SiO2-CaO-Al2O3 with a SiO2/CaO ratio of 1:1 and 2:1 were fabricated and their behavior characterized. It was tentatively established that the rate determining mechanism of alumina solution both during the initial processing of the ceramic and during its subsequent reaction during metallizing with refractory metal paints containing oxide additions, was the chemical reaction rate. Lucalox, sapphire, beryllia and fused quartz vacuum tight seals were made and their sealing mechanisms were examined as were those of several commercial alumina ceramics. It was established that chemical and/or semiconducting bond mechanisms were responsible for the actual sealing process of refractory metal to the oxide substrate. The electrical studies included dc resistance measurements, low power rf conduction and dielectric loss studies, and high power loss studies. In addition to usage on high power klystrons, the low loss metallizing development in this study can profitably be used on planar triodes and reflex klystrons.

AD-637 078 **Field 11B, 20B, 20L**
Systems Research Labs., Inc., Dayton, Ohio.
ELECTRICAL PROPERTIES AND DEFECT STRUCTURE OF ZIRCONIA: II, TETRAGONAL PHASE AND INVERSION.
Revised ed.
by R. W. Vest, and N. M. Tallan. 19 Mar 65, 8p
Contract AF 33 (615)-2765
Proj. AF-7021
ARL-65-272
Revision of manuscript submitted 7 Dec 64. Prepared for presentation at the Annual Meeting of the American Ceramic Society (66th), Chicago, Ill., April 21, 1964.

Descriptors: (*Zirconium compounds, Oxides), (*Crystal lattice defects, Zirconium compounds), Ceramic materials, Electrical properties, Oxygen, Pressure, Transformations, Electrical conductance, Carriers (Semiconductor), High-temperature research.

The defect structure of tetragonal zirconia was investigated by measuring the temperature and oxygen partial pressure dependence of the electrical conductivity and the electronic transference number. Tetragonal zirconia was a mixed electronic and ionic conductor under all conditions studies. The n-type electronic conductivity observed at high temperatures and low oxygen partial pressures was interpreted on the basis of a defect model involving fully ionized oxygen vacancies. The conductivity change associated with the monoclinic tetragonal phase transformation was isothermal, but the rate of change was a function of the thermal history and the method of preparation of the sample. (Author)

N66-16471 **Field 11B**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.

STUDY OF GROWTH PARAMETERS FOR REFRACTORY CARBIDE SINGLE CRYSTALS.
Quarterly status rept. no. 7, 1 Sep-1 Dec 65.
by R. W. Bartlett, and W. E. Nelson. 5 Jan 66. 21p
Contract NASr-49 (19)
NASA-CR-69912

Descriptors: *Crystal growth, *Carbide, *Tantalum.

For abstract, see T 66 18.

AD-636 344 **See Field 20L**

AD-636 536 **See Field 7D**

AD-636 624 **See Field 13H**

AD-636 954 **See Field 10B**

AD-637 021 **See Field 13H**

BMI-1738 **See Field 18J**

NAA-SR-11813 **See Field 11F**

11C. COATINGS, COLORANTS, AND FINISHES

AD-636 700 **Field 11C, 13J**
CFSTI Prices: HC$1.00 MF$0.50
Resin Research Labs., Inc., Newark, N. J.
DEVELOPMENT OF A SPECIALITY PAINT FOR SUBMARINE INTERIORS.
Final progress rept., 1 Apr-31 Dec 64.
by Alan E. Weinberg, P. E. Esemplare, and Robert B. Baker. 31 Dec 64. 20p Rept. no. 64-72
Contract NObs-90296
Proj. SR-007-08-05
Task 1201

Descriptors: (*Plastic paints, Submarines), Military requirements, Water, Colloids, Fire resistant coating, Compatibility.

A water emulsion alkyd based paint was developed which is comparable to military formula 124/58 solvent based paint in the relevant aspects of military specification MIL-E-17970C and related aspects of Federal Test Method Standard No. 141. The water based paint is superior to the present solvent based system from the standpoint of nonflammability, lack of odor, and absence of toxic fumes. The paint is made by emulsifying a benzene solution of chlorinated alkyd resin and driers. Then, by vacuum distillation, the benzene is removed, leaving behind a dispersion of very fine particles in water. This dispersion is then mixed with an aqueous pigment dispersion to produce the finished paint.

AD-636 828 **Field 11C**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
VOLATILE PHOTODEGRADATION PRODUCTS OF ORGANIC COATINGS.
Technical rept. for Jun 64-Jul 65.
by Peter J. Hearst. Jul 66, 38p NCEL-TR-R-460
Proj. Y-F020-03-03-004

Descriptors: (*Organic coatings, Degradation), (*Plastic coatings, Degradation), Photolysis, Vapors, Spectra (Infrared), Polyester plastics, Oils, Vinyl plastics, Epoxy plastics, Amino plastics, Polyamide plastics, Carbon dioxide, Pigments.

Various clear and pigmented vehicle films were irradiated in air with a mercury arc and a xenon arc. The volatile photodegradation products were identified by infrared spectroscopy. The coatings included alkyd, oil, vinyl-alkyd, vinyl copolymer, partially hydrolyzed vinyl copolymer, polyvinyl acetate, epoxy-amine, and epoxy-polyamide films. The major product from all films was carbon dioxide. Eleven other products or types of products were obtained, as well as some unidentified products. The addition of pigments decreased the yields of almost all the products. However, the yields of different products were affected in different degrees by pigmentation, and this difference may in part be related to the penetration of the light responsible for the production of each particular product. (Author)

PB-170 813 **Field 11C, 13H, 13C**
CFSTI Prices: HC$1.50 MF$0.50
Bureau of Reclamation, Denver, Colo. Chemical Engineering Branch.
PRELIMINARY INVESTIGATION OF ELECTRODEPOSITED ASPHALT COATINGS.
by W. R. Morrison. Feb 66, 43p ChE-55

Descriptors: (*Bituminous coatings, *Electrodeposition), (*Civil engineering, Bituminous coatings), Corrosion inhibition, Coatings, Pipes, Feasibility studies, Asphalt, Iron, Colloids.

A preliminary laboratory study was conducted to determine the feasibility of using electrodeposited asphalt coatings for controlling irrigation well casing corrosion. Black iron pipe sections (2 in. inside dia by 4 in. in length) corroded by nitric acid were used to simulate well casings. Investigation included tests to determine the best asphalt-emulsion material, dilution, and electrical potential requirement for depositing an asphalt coating on iron pipe. Durability of the deposited coatings was not evaluated. Test results indicated: (1) A satisfactory asphalt coating was electrodeposited on black iron pipe using a hard-base proprietary cationic asphalt emulsion diluted to 20% by volume concentration and subjected to a rectifier output voltage of 50 v. (2) For asphalt emulsion in concentrations of 5, 10, and 20% by volume, the 20% asphalt emulsion produced the best electrodeposited coating. (3) A potential drop across the electrodes ranging from 5 to 20 v, and an average current density of about 5 ma/in. squared provided the best condition for electrodeposition. (4) Tests conducted at higher voltages resulted in some breakout of asphalt on the surface and an increased amount of gas products formed at the pipe face. Also, the efficiency (grams of asphalt deposited per ampere-minute) was lower. (5) The rate at which asphaltic materials are deposited is important for obtaining a uniform coating. (Author)

AD-636 422 **See Field 13J**

AD-636 611 **See Field 20L**

11D. COMPOSITE MATERIALS

AD-636 942 **Field 11D**
CFSTI Prices: HC$2.00 MF$0.50
New York Univ., N. Y. School of Engineering and Science.
RESEARCH ON HIGH PRESSURE MEDIA.
Final scientific rept., 1 Mar 65-28 Feb 66.
by M. Prince, and Y. Okamoto. Apr 66, 33p
Contract AF 19 (628)-4996
Proj. AF-5621
Task 562101
AFCRL-66-335

Descriptors: (*High-pressure research, Gaskets), (*Gaskets, Materials), (*Composite materials, Gaskets), Plastics, Littium compounds, Hydrides, Boron, Heat-resistant materials, Molding, Machining, Thermal stability, X-rays, Absorption, Phenyl ethers, Polyethylene plastics, Carbon black, Presses (Machinery).

An investigation was made of the preparation of new gasketing materials for ultra-high pressures with maximum x-ray transparency. Satisfactory results were obtained with composite materials based upon lithium hydride-organic plastics and amorphous boron-organic plastics. These composites are moldable and easily machinable materials. The lithium hydride composites performed without decomposition to 500C and the boron composites to 1100C. All have functioned as excellent gasketing materials with high x-ray transparency up to pressures of 32 Kbar and at maximum tested temperatures for at least 30 minutes. Convenient techniques were developed for rapidly molding tetrahedra for use in tetrahedral anvil high pressure devices. (Author)

AD-636 975 **Field 11D**
CFSTI Prices: HC$1.00 MF$0.50
State Univ. of New York, Stony Brook.
SURFACE FILM FORMATION OF E GLASS.
by Sumner N. Levine, and William C. LaCourse. 10 Aug 66, 13p

Descriptors: (*Glass textiles, Surface properties), Composite materials, Plastics, Films, Calcium, Adsorption, Microstructure, Oxalic acids, Sodium compounds, Hydroxides.

As part of a program concerned with the influence of surface properties of glass on the behavior of reinforced plastics, a report is made on the formation of films on the surface of E glass on exposure to Oxalic acid solutions. No such films were observed with 994 glass treated under identical conditions. As is well known, both of these glasses are employed in the production of glass reinforced plastic. Evidence is provided that the film is associated with the Ca + 2 ions in E glass. Experiments indicate that this ion is deficient in the surface of E glass. Thus fractured E glass exhibits much more rapid film formation than the native surface. Moreover, prior removal of the native surface on treatment with NaOH solution also results in more rapid film formation. (Author)

N66-15615 **Field 11D**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif. Dept. of Materials Science.
MECHANISMS OF STRENGTHENING AND FRACTURE IN COMPOSITE MATERIALS.
Progress rept. no. 3, 1 Jun - 30 Nov 65.
by A. S. Tetelman. 1965, 16p
Grant NsG-622
NASA-CR-69483

Descriptors: *Composite material, *Deformation, *Tensile strength, *Brittleness, *Fracture.

For abstract, see T 66 18.

AD-636 588 **See Field 13H**

AD-636 651 **See Field 11I**

11E. FIBERS AND TEXTILES

AD-636 623 **Field 11E, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
OBTAINING POLYMERS BY THE METHOD OF INTERPHASAL CONDENSATION.
by N. V. Mikhailov, and V. I. Maiboroda. 26 May 66, 13p FTD-TT-65-1898
TT-66-61934
Unedited rough draft trans. of Khimicheskie Volokna (USSR) n2 p19-22 1963.

Descriptors: (*Heat-resistant plastics, Fibers (Synthetic)), (*Fibers (Synthetic), Preparation), (*Polymers, *Condensation reactions), Phase studies, Concentration (Chemistry), Organic solvents, Viscosity, Films, Crystal structure, Melting point, Polymerization, USSR.

A high-melting polymer was obtained which is capable of film formation on the boundary of the separation of the phases. The influence of concentrations of original monomers, their relationship, and the nature of the applicable organic solvents on the yield, specific viscosity and film formation was

clarified. It was established that the synthesized polymers have crystalline structure. It was shown that the highest temperature of fusion (345 - 350C) is possessed by a polymer obtained on the basis of 'dian' and terephthalic dichloroanhydride. (Author)

AD-636 673 **Field 11E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SYNTHETIC FIBERS (SELECTED ARTICLES).
26 May 66, 24p FTD-TT-65-1897
TT-66-61958
Unedited rough draft trans. of Khimicheskie Volokna (USSR) n3 p9-11, 20-4 1963.

Descriptors: (*Fibers (Synthetic), Preparation), (*Acrylonitrile polymers, Preparation), (*Polyethylene plastics, Preparation), Extrusion, Plasticizers, Molecular weight, Copolymerization, Peroxides, Reaction kinetics, Catalysis, USSR.

Contents: Studying the process of extracting polyacrylonitrile fibers, by T. Ya. Grishina, E. A. Pakshver, and V. L. Tsiperman; Modification of polypropylene fibers, tissues and textures by the adoption of acrylonitrile, by Z. Manyasek, M. Michko, et al.

AD-637 101 **Field 11E**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
UKRAINIAN JOURNAL OF PHYSICS (SELECTED ARTICLES).
9 May 66, 42p FTD-TT-65-808
TT-66-62048
Edited trans. from Ukrayinskyi Fizychnyi Zhurnal (USSR), v9 n7 p769-91 1964.

Descriptors: (*Fibers (Synthetic), Physical properties), Thermal properties, Mechanical properties, Refraction, Melting points, Density, Heat treatment, Polyethylene plastics, Nylon, Polyester plastics, Dacron, USSR.

Contents: Thermomechanical properties and birefringence of synthetic fibers, by O. Z. Golik, N. A. Rindich and M. Yu. Kuchinka; Determination of melting point of synthetic fibers by means of birefringence, by O. Z. Golik, M. Yu. Kuchinka and M. O. Genina; Effect of heat- and thermomechanical treatments on the density of some synthetic polymers, by O. Z. Golik, N. A. Rindich and M. Yu. Kuchinka.

AD-636 412 **See Field 8A**

AD-636 922 **See Field 12A**

11F. METALLURGY AND METALLOGRAPHY

AD-465 537 **Field 11F, 20K**
CFSTI Prices: HC$2.00 MF$0.50
Columbia Univ., New York. Inst. for the Study of Fatigue and Reliability.
EXTENSION OF COPPER AND BRASS UNDER TENSION AND CYCLIC TORSION.
by W. A. Wood, and W. H. Reimann. Apr 65, 34p
Technical rept. TR-18
Contract Nonr-266 (91)
Proj. NR-064-470

Descriptors: (*Copper, Creep), (*Brass, Creep), Stresses, Strain (Mechanics), Tensile properties, Loading (Mechanics), Fatigue (Mechanics), Distortion.

A study is made of the axial creep in copper and brass at various temperatures under steady axial tension and cyclic transverse torsion. One object was to find why some metals like copper exhibit creep that resembles high-temperature creep in showing primary, secondary, and tertiary stages while other metals like brass show transient creep only. It is shown that the difference arises because of differences in fatigue processes induced by the cyclic strain. Another object was to determine how the metals hardened during creep in the axial and transverse directions. It is found that in the axial direction hardening occurs progressively during creep and depends only on the extension, while in the transverse direction cyclic hardening at first increases and then approaches a steady value which coincides with cessation of the transient creep. It is pointed out that it is difficult to reconcile this hardening with dislocation theories that attribute the creep to recovery and that the creep is more in keeping with certain continuum-mechanics theories of irreversible second-order effects. (Author)

AD-465 538 **Field 11F, 20K**
CFSTI Prices: HC$2.00 MF$0.50
Columbia Univ., New York. Inst. for the Study of Fatigue and Reliability.
CORRELATION OF OPTICAL AND ELECTRON-OPTICAL OBSERVATIONS IN TORSION FATIGUE OF BRASS.
by J. C. Grosskreutz, W. H. Reimann, and W. A. Wood. Apr 65, 35p Technical rept. TR-19
Contract Nonr-266 (91)
Proj. NR-064-470

Descriptors: (*Brass, Fatigue (Mechanics)), (*Fatigue (Mechanics), Brass), Torque, Etched crystals, Microscopy, Electron microscopy, Crystal lattice defects, Foils.

Optical micrographs of etched sections of torsion fatigued brass are compared with transmission electron micrographs of foils prepared from comparable specimens. In this way it was possible to elucidate the microstructural changes produced by fatigue and shown by optical microscopy by viewing them also at the high resolution of the electron microscope. Dispersed slip of what has been termed the S fatigue range in optical studies corresponded with dispersed 9 x 10 to the 8th power/sq cm. Concentrated slip in what has been termed the F range corresponded with concentrations of dislocations, loops, and debris. Cell formations in what has been termed the H range corresponded with cellular dislocation distributions. (Author)

AD-466 007 **Field 11F, 13H**
CFSTI Prices: HC$6.60 MF$0.75
Reactive Metals, Inc., Niles, Ohio.
PROCESSING STUDY OF Ti-7Al-2Cb-1Ta.
Final summary rept.
by S. R. Seagle, L. R. DeBlasio, and O. Bertea.
1 Feb 65, 71p
Contract N161-25741
MEL-12/65

Descriptors: (*Titanium alloys, Material forming), Aluminum alloys, Niobium alloys, Tantalum alloys, Heat treatment, Grain structures (Metallurgy), Quenching (Cooling), Aging (Materials), Temperature, Time, Extrusion, Melting, Rolling (Metallurgy), Metal plates, Ductility, Fracture (Mechanics), Toughness, Impact shock, Microstructure, Tensile properties, Tables.

The objective of the study was to evaluate various processing techniques for increasing the yield strength of Ti-7Al-2Cb-1Ta (721) plate while maintaining satisfactory ductility and fracture toughness. Using material from the same heat, 1 in. thick plates of the 721 alloy were produced on an extrusion press, a planetary mill and a rolling mill. For each of the three processes, two finishing temperatures was evaluated. Plate in fourteen heat treated conditions from each of the finishing temperatures was evaluated for tensile properties and fracture toughness. Three methods were found for improving the strength of 721 plates. The first method was to refine the grain size through low temperature processing. Compared to plate processed at higher temperatures, this resulted in improved strength and a minor decrease in impact energy. It is doubtful that sufficient work could be applied to thick plate at the necessary temperatures to consistently achieve this desirable grain size. The second method involved water quenching after rolling or annealing at temperatures near the beta transus. Compared to 1" plate fabricated by the normal mill process, an increase of 7 to 10 ksi in yield strength was obtained without an appreciable change in the ductility and impact energy. The third method involved aging at 1100degrees F after the quenching treatment. The aging further increased the yield strength of quenched plate 5 to 8 ksi. However, this was accompanied by a moderate decrease in impact energy. The second and third processes offer the greatest potential for scale-up to large plate processing. The acceptable level of fracture toughness would determine which processing procedure should be further evaluated. (Author)

AD-478 909 **Field 11F**
CFSTI Prices: HC$4.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
CORROSION FATIGUE AND STRESS CORROSION CRACKING OF AN ALUMINIUM-5% MAGNESIUM-4% ZINC ALLOY TOTALLY IMMERSED IN 3% NaCl AND OTHER CORRODENTS.
Technical rept.
by P. J. E. Forsyth, and E. G. F. Sampson. Aug 65, 43p TR-65158

Descriptors: (*Aluminum alloys, Stress corrosion), (*Stress corrosion, Aluminum alloys), Fatigue (Mechanics), Corrosive liquids, Chlorides, Sodium compounds, Fracture (Mechanics), Magnesium alloys, Zinc alloys, Hydrogen compounds, Metallography, Fractography, Corrosion, Solutions, Great Britain, Electrolytes, Test methods, Stresses, Frequency, Cathodic protection, Propagation, Liquid immersion tests.

Corrosion fatigue and stress corrosion tests were made on aluminum-5% Mg-4% Zn alloy in two conditions of heat-treatment, aged to peak hardness at 120C and at 150C. All crack paths were intercrystalline under both corrosion fatigue and stress corrosion conditions, although air fatigue cracks in this material are mainly transcrystalline. The slopes of the S/log n curves for 20 and 180 c/min were similar, but the 1500 c/min curve had a smaller slope. This difference was clearly associated with the 'knee' in the 20 c/min curve that was not evident at the higher test frequency. The effects of both anodic and cathodic polarization were studied. Marked changes in crack growth rate were observed when a fatigue specimen was alternately made anodic and cathodic in a 3% NaCl solution against either a Pe or Al electrode with an externally impressed current. Similar changes in crack growth rate could be obtained with impressed currents under steady stress corrosion conditions. Stress corrosion crack growth rates were shown to be dependent on the chloride ion concentration of electrolytes used, suggesting a metal dissolution mechanism of stress corrosion in this material.

AD-636 442 **Field 11F, 20F, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Dow Chemical Co., Golden, Colo. Rocky Flats Div.
ELLIPSOMETER STUDIES ON THE CLEANING AND OXIDATION OF URANIUM.
by D. T. Larson, and N. W. Taylor. 22 Jun 66, 24p
RFP-674
Contract AT (29-1)-1106

Descriptors: (*Uranium, Surface properties), (*Surface properties, *Optical analysis), (*Films, Uranium), Oxidation, Cleaning, Sputtering, Refractive index, Thickness, Reaction kinetics, Optical instruments.

Identifiers: Ellipsometry.

An ellipsometer was found to be an effective instrument in the investigation of sputter cleaned and oxidized uranium. The experimental and theoretical equations, necessary for the determination of the optical constants of a clean surface and the index of refraction and thickness of films on the surface, was solved algebraically and the solutions programmed for a computer. Uranium coupons were sputter cleaned in argon, and ellipsometer readings were taken until no further change was noted. A reproducible value of the endpoint of the sputter cleaning process was obtained for several different samples which was assumed to represent the value of a clean surface. From this, the index of refraction of sputter cleaned uranium was calculated to be 3.10 - 3.06i. The results demonstrated the suitability of an ellipsometer for measuring a reproducible state of the surface as a starting point for gas-metal reaction studies. Oxide film thickness and the index of refraction were determined using the Winterbottom graphical technique. The index of refraction of the oxide films was found to be 2.1 - 0.5i. This index of refraction for oxides prepared at 50 microns oxygen and 23 , 50 and 75 C was the same, although the index of refraction of the oxide prepared at 50 microns oxygen and 100 C appeared to be slightly different. (Author)

AD-636 487 **Field 11F, 20B**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Dept. of Engineering Mechanics.
AN ELECTRON TRANSMISSION STUDY OF OXIDE PARTICLE STATISTICS IN TD-NICKEL ALLOY.
Final scientific rept., 1 May 65-30 Apr 66.
by Maurice C. Inman, and Patrick J. Smith. Jun 66, 41p
Grant AF-AFOSR-669-65
Proj. AF-9782
Task 978202
AFOSR-66-1111

Descriptors: (*Nickel alloys, *Dispersion hardening), Thorium compounds, Oxides, Particle Size, Electron microscopy, Crystal substructure, Hardness, Recrystallization.

Identifiers: Thorium oxide.

Electron microscope studies of the substructure of nickel strengthened by dispersed thorium oxide particles were made. Special attention was paid to the problem of the stability of a strenthening dispersion in terms of particle size distribution and agglomeration with respect to environmental temperatures ranging to the melting point (1450C) of the nickel matrix. Electron microscope dark field techniques were also employed to investigate the crystal structure of individual particles in the above temperature range. Finally, the bulk strength (in terms of microhardness) as a function of time at various temperatures was interpreted in the light of the substructural observations. (Author)

AD-636 547 **Field 11F**
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Casting and Solidification Section.
EFFECTS OF SOLIDIFICATION VARIABLES ON INGOT STRUCTURE.
Rept. for Jun 64-Jun 65.
by M. C. Flemings, T. F. Bower, T. Z. Kattamis, and H. D. Brody. 1 May 66, 124p
Contract DA-19-020-ORD-5706 (A)
See also AD-618 413.

Descriptors: (*Casting alloys, *Phase studies), Freezing, Grain structures (Metallurgy), Copper alloys, Aluminum alloys, Microstructure, Magnesium alloys, Zinc alloys, Eutectics, Casting.

Results are summarized of experimental and analytical studies of solutionizing aluminum alloys containing a non-equilibrium second phase. Dendrite arm spacing, solution treatment temperature, and alloy content are the important processing variables determining time required to eliminate second phase. At a typical temperature used to solutionize 'premium quality' aluminum-4.5 per cent copper alloy castings, required time for essentially complete elimination of second phase is 25 times the original solidification time. Experiments were conducted on dendritic and non-dendritic solidification of aluminum-copper alloys and of a magnesium-zinc alloy. Grain diameter in the non-dendritic melts was found to depend on solidification time in quantitatively the same way as dendrite arm spacing in the dendritic melts.

AD-636 600 **Field 11F, 13K**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
DETERMINATION OF CHARACTERISTIC STRESSES ON TUBES OF ALUMINUM ALLOYS. PART II. TESTS AND TEST READINGS.
by W. Sautter, and W. Gruhl. 2 Mar 66, 23p
FTD-TT-65-1068
TT-66-61916
Unedited rough draft trans. of das Metall (West Germany) v18 n9 p918-2264.

Descriptors: (*Aluminum alloys, Stresses), (*Pipes, Stresses), West Germany, Test methods.

A simple method is proposed for the determination of the tangential characteristic stresses in tubes of aluminum alloys. The tube sections are split parallel to the longitudinal axis and gradually machine turned externally or internally, wherein the value of the tangential characteristic stresses can be computed from the variation in the width of the split. The longitudinal characteristic stresses are determined from the variation of the transverse bending in the removal of slender strips taken away in a longitudinal direction. In the first part of this work, the equations required for the stress measurements were developed and discussed in detail. The comparative measurements conducted in the present second part by the application of this method and the G. Sachs method lead to results that are in agreement. The dependence of the measured results on the length of the test piece was investigated. Finally the effect of various quenching conditions, the effect of heat treatment and cold deformation, on the type and magnitude of the characteristic stresses of tubes of A1ZnMgCu0.5 and A1Mg3 are presented by means of several examples. (Author)

AD-636 640 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE EFFECTS OF A THIRD COMPONENT ON THE PHYSICAL PROPERTIES OF A1-Mn ALLOYS.
by N. I. Varich, L. M. Burov, and K. E. Kolesnichenko. 21 Mar 66, 12p FTD-TT-65-2017
TT-66-61928
Unedited rough draft trans. of Fizika Metallov i Metallovedenie (USSR) v18 n3 p396-400 1964.

Descriptors: (*Aluminum alloys, Manganese alloys), (*Phase studies, Aluminum alloys), Metallography, USSR, Physical properties, Solid solutions, Hardness, Magnetic properties, Thermoelectricity, Resistance (Electrical), Annealing, Tungsten alloys, Vanadium alloys, Molybdenum alloys, Tantalum alloys, Titanium alloys, Rhenium alloys, Iron alloys, Copper alloys, Zirconium alloys.

A study was made of the effects of a third component on the state of a strongly supersaturated solid solution of the A1-Mn system. Through the methods of x-ray analysis, measuring the micro-hardness, magnetic susceptibility, thermo-emf and electrical resistivity during isochronal and isothermal annealing the kinetics of decomposition of strongly supersaturated solid solutions in ternary alloys was investigated. It was established that the majority of elements taken as the third component noticeably delayed the decomposition of the solid solution in comparison with the A1-Mn double system. (Author)

AD-636 683 **Field 11F, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
STUDY OF THE TRANSFORMATIONAL CHARACTERISTICS AND THE WELDABILITY OF HY-80 STEEL.
Quarterly progress rept. 1 Mar-1 Jun 62.
1 Jun 62, 16p
Contract NObs-78813

Descriptors: (*Steel, *Welding), Transformations, Fracture (Mechanics), Ductility, Rupture, Stresses, Tempering, Notch sensitivity, Brittleness.

Identifiers: Steel HY-80.

Work was directed toward: (1) Completion of the continuous cooling transformation diagram for the HY-80 rich analysis. (2) Investigation of cold-cracking behavior of HY-80 rich analysis by electrolytic charging of hydrogen into notched tensile specimens previously treated using the R.P.I. synthetic specimen technique to produce a grain coarsened structure similar to that observed in a weld heat affected zone. (3) Determination of the hot ductility behavior of HY-80 rich analysis (crack sensitive history), HY-80 lean analysis (crack sensitive history). (4) Examination of the short time stress-rupture behavior of the four steels mentioned above in the grain-coarsened condition, both at elevated temperature (1900F) and at commonly used tempering temperatures. (5) Studies of the impact properties of specimens synthetically treated to produce a grain-coarsened heat-affected zone structure and then furnace stress-relieved for 1 hour at various temperatures. (Author)

AD-637 044 **Field 11F, 13M, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
SECOND CORROSION SURVEY OF STEEL SHEET PILING.
Technical rept.
by C. V. Brouillette, and A. E. Hanna. Aug 66, 18p TR-R-467
Proj. Y-F020-03-04-001
See also PB-171 501.

Descriptors: (*Corrosion, Steel), (*Foundations (Structures), Corrosion), (*Steel, *Corrosion inhibition), Sheets, Cathodic protection, Coatings.

Identifiers: Piles (Structural).

In-service steel sheet piling was investigated in 1959 at eight naval stations. In 1965 the piling at five of these stations was investigated again to gather further information on the corrosion rates of steel sheet piling at waterfront locations. The value of applying maintenance coatings from the mean low-water mark to the top of the piling and of using cathodic protection was reaffirmed by this second survey. (Author)

AD-637 102 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
INVESTIGATION ON THE STRESS-RUPTURE STRENGTH OF COLD STRESSED TUNGSTEN AND ITS ALLOY WITH MOLYBDENUM AT TEMPERATURES ABOVE 1400 C.
by I. A. Ezhov, E. K. Zakharov, and I. N. Kidin. 2 Mar 66, 8p FTD-TT-65-1369
TT-66-62049
Unedited rough draft trans. of mono. Nauchnyi Sovet Po Probleme Zharorrochnykh Splavov. Issledovaniya Stalei i Splavovo, Izdvo Nauka. Moskva, 1964, p118-20.

Descriptors: (*Tungsten, Rupture), (*Tungsten alloys, Rupture), USSR, Molybdenum

alloys, Stresses, Deformation, High-temperature research, Creep, Plasticity.

The tests for stress-rupture strength were made by rapid heating of already loaded specimens and marking the time up to failure. The lengthening of the specimen connected with the creep was measured every minute. The rate of the heating was about 1000 C per second. The time up to failure varied in accordance with the selection of loads and amounted to from 1 to 100 minutes. A comparison of the stress-rupture strength of tungsten with that of the alloy VM50 shows that the alloy for 10-minute strength on 4 - 1 kg-wt/sq mm yields to tungsten. At the same time, the alloy possesses long-lasting plasticity, longer than that of pure tungsten. The failure of the alloy VM50 occurred ordinarily with the formation of a neck, and sometimes with several necks. Good combination of strength and plasticity assures the possibility of the use of the alloy VM50 as high-temperature building material.

ANL-6283 **Field 11F, 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.50
Argonne National Lab., Ill.
FABRICATION OF SPIKED-CORE FUEL ELEMENTS FOR THE EXPERIMENTAL BOILING WATER REACTOR.
Final rept.
by W. C. Kramer, F. D. Mc Cuaig, and R. A. Beatty. Nov 65, 63p
Contract W-31-109-eng-38

Descriptors: (*Boiling water reactors, Reactor fuel elements), (*Reactor fuel elements, Reactor cores).

For abstract, see N 20 16.

ANL-7101 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
ELASTICITY AND ANELASTICITY OF URANIUM OXIDES AT ROOM TEMPERATURE.
by Roberto J. Forlano, Alfred W. Allen, and Robert J. Beals. Dec 65, 75p
Contract W-31-109-eng-38
Prepared in cooperation with Illinois Univ., Urbana.

Descriptors: (*Uranium compounds, Oxides), (*Elasticity, Uranium compounds).

For abstract, see N 20 16.

NAA-SR-11813 **Field 11F, 18J, 11B**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
ZONE MELTING OF URANIUM MONOCARBIDE.
by G. Ervin Jr. and A. K. Smalley. 25 May 66, 26p
Contract AT (11-1)-GEN-8

Descriptors: (*Zone melting, Uranium compounds), (*Uranium compounds , Carbides).

For abstract, see N 20 16.

N66-10741 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
English Electric Co., Ltd., Whetstone (England). Central Metallurgical Labs.
THE EROSION OF A COBALT CHROMIUM ALLOY BY LIQUID IMPACT.
by J. B. Marriott, and G. Rowden. 28 Jun 65, 16p
W/LAU.175

Descriptors: *Cobalt alloy, *Impact load, *Materials erosion, *Shielding, *Stream turbine, *Water jet.

N66-13178 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Weapons Research Establishment, Aldermaston (England).
THE WATER VAPOUR CORROSION OF URANIUM AND ITS PREVENTION.
by V. J. Corcoran, C. Johnston, W. J. Metcalfe, and J. Thrope. Jul 65, 20p AWRE-O-42 (65)

Descriptors: *Corrosion prevention, *Water vapor, *Oxygen, *Protective coating, *Uranium.

N66-14066 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. Marshall Space Flight Center.
DISTRIBUTION OF FAILURE TIMES IN STRESS CORROSION TESTS.
by J. B. Gayle. 1 Nov 65, 16p NASA-TM-X-53355

Descriptors: *Aluminum alloy, *Failure mode, *Stress corrosion.

N66-14132 **Field 11F**
CFSTI Prices: HC$4.00 MF$1.00
TRW, Inc., Cleveland, Ohio. Materials and Processes Dept.
CHEMICAL THERMODYNAMICS IN NONFERROUS METALLURGY. VOLUME III. THERMODYNAMICS OF TUNGSTEN, MOLYBDENUM, TITANIUM, ZIRCONIUM, NIOBIUM, AND TANTALUM AND THEIR MORE IMPORTANT COMPOUNDS.
by R. J. Quigg, and S. T. Scheirer. 20 Oct 65, 121p ER-6666
Contract NAS3-7267
NASA-CR-54504

Descriptors: *Nickel alloy, *Intermetallics, *Precipitation, *Refractory metal, *Solid solution, *Superalloy.

N66-14169 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Geneva (Switzerland).
ON THE THEORY OF NOTCH-BRITTLENESS IN STEELS OCCURRING DURING TIME-TO-RUPTURE TESTS.
by W. Siegfried. Aug 65, 81p
Contract EURATOM-100-62-12 RDS
EURAEC-1350, EUR-2325.E
Prepared for presentation at Nat'l. Meeting of Asme, Berkeley, Calif., 9-11 Jun 65.

Descriptors: *Brittleness, *Notch strength, *Steel, *Rupture.

N66-14505 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Laboratories Du Centre D Etude De L Energie Nucleaire, Mol (Belgium).
SWELLING OF URANIUM SECOND YEAR OF STUDY.
by S. Amelincky, P. Delavignette, M. George, E. Ruedl, and L. Stals. Sep 65, 44p
Contract EURATOM-087-62-4 RDB
EURAEC-1333, EUR-2310.E

Descriptors: *Dislocation, *Radiation effect, *Swelling, *Uranium, *Electron microscopy.

N66-14688 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
British Non-Ferrous Metals Research Association, London (England).
AGEING OF CHROMEL-ALUMEL THERMOCOUPLES.
by V. A. Callcut. 31 Aug 65, 15p TRG-1021/R (X)

Descriptors: *Aging, *Calibration, *Drift, *Thermocouple, *Immersion.

N66-15459 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy Establishment, Bombay (India). Chemistry Div.
DIFFUSION OF SILVER IN ALUMINUM.
by R. P. Agarwala, and M. S. Anand. 1965, 18p AEET-221

Descriptors: *Diffusion coefficient, *Metallurgy, *Silver alloy, *Activation energy, *Aluminum alloy.

N66-15884 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Sero- and Astronautical Research Inst., Amsterdam (Netherlands).
PROGRAMME-FATIGUE TEST ON ALUMINIUM ALLOY LUG SPECIMENS WITH SLOTTED HOLES AND EXPANDED HOLES.
by F. A. Jacobs, and J. Schijve. Nov 64, 38p
NLR-TN-M.2139

Descriptors: *Aluminum alloy, *Fatigue test, *Lug.

N66-16220 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy Establishment, Bombay (India). Chemistry Div.
DIFFUSION BONDING BETWEEN ALUMINIUM AND NICKEL.
by R. P. Agarwala, S. P. Murarka, and B. M. Pande. 1964, 17p AEET (CD)26

Descriptors: *Aluminum, *Diffusion bonding, *Metal-metal bonding, *Nickel.

N66-16486 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.50
Lockheed Missiles and Space Co., Sunnyvale, Calif.
DEVELOPMENT OF A PHOTOELASTO-PLASTIC METHOD TO STUDY STRESS DISTRIBUTIONS IN VICINITY OF A SIMULATED CRACK-PHASE I AND II.
by A. R. Hunter. Oct 65, 59p LMSC-4-05-65-11
Contract NAS1-4760
NASA-CR-66039

Descriptors: *Aluminum alloy, *Photoelastic stress measurement, *Polymer, *Elastoplasticity, *Stress distribution.

N66-18311 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Materials Development Lab.
DEVELOPMENT OF HIGH-TEMPERATURE CHROMIUM ALLOYS.
Semiannual rept no. 1.
by J. W. Clark, and C. S. Wukusick. 25 Oct 65, 53p
Contract NAS3-7260
NASA-CR-54486

Descriptors: *High temperature alloy, *Air breathing engine, *Chromium alloy.

AD-448 094 **See Field 21E**

AD-636 287 **See Field 20D**

AD-636 289 **See Field 13J**

AD-636 290 **See Field 13J**

AD-636 304 **See Field 13J**

AD-636 305 **See Field 13J**

AD-636 306 **See Field 13J**

AD-636 307 **See Field 13J**

AD-636 308 **See Field 13J**

AD-636 309 **See Field 13J**

AD-636 310 **See Field 13J**

AD-636 412 **See Field 8A**

AD-636 588 See Field 13H

AD-636 624 See Field 13H

AD-636 625 See Field 20L

AD-636 626 See Field 7D

AD-636 676 See Field 13H

AD-636 684 See Field 13J

AD-636 703 See Field 7D

AD-636 733 See Field 13J

AD-636 739 See Field 13J

AD-636 741 See Field 13J

AD-636 742 See Field 13J

AD-636 743 See Field 13J

AD-636 746 See Field 13J

AD-636 749 See Field 13J

AD-636 752 See Field 13J

AD-636 963 See Field 13D

ANL-7074 See Field 18J

ANL-7204 See Field 18I

BMI-1738 See Field 18J

NAA-SR-11887 See Field 18D

11G. MISCELLANEOUS MATERIALS

PB-169 740 See Field 5C

11H. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-636 402 Field 11H
CFSTI Prices: HC$1.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
FRICTION AND WEAR OF COMPOSITE SOLID LUBRICATING MATERIALS.
Research and Development Phase rept.
by G. L. Thomas. Jul 66, 21p MEL-28/66
Projs. S-F013-08-05, S-F020-03-05
Task 4090

Descriptors: (*Lubricants, Solids), (*Composite materials, Lubricants), Compressors, Lubrication, Friction, Wear resistance, Halocarbon plastics, Epoxy plastics, Porous metals, Additives, Foamed metals, Plastics, Heat-resistant materials.

Solid lubricants present a solution in some applications to the need for safe, effective lubrication in the higher temperature and pressure ranges demanded by Navy machinery. Friction and wear characteristics of self-lubricating-type composite materials have been evaluated for potential high-pressure air compressor application using a bench-scale apparatus. A few of the materials have been used successfully in a nonlubricated cylinder seal application. (Author)

AD-636 596 Field 11H
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
FILLERS AS COMPONENTS OF PACKING GREASES.
by I. G. Fuks, and V. V. Vaynshtok. 25 May 66, 13p FTD-TT-65-1844
TT-66-61909
Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) v9 n7 p59-65 1964.

Descriptors: (*Greases, *Lubricant additives), USSR, Shear stresses, Microstructure.

The hermetization ability of packing greases with fillers depends upon the value of their maximum shear stress, due to the introduction of these solid grease components. The given parameter should serve as one of the basic lab characteristics of exploitational properties of packing greases. The effect of fillers on maximum shear stress of greases and evidently, on other of their exploitation properties, is determined by the nature of fillers and the remaining components of greases, and also by the dispersion and filler concentrations. Investigation of filler for the nature of their action on the properties of lithium greases (on the basis of castor oil) can be divided into inert, active and chemically reacting. (Author)

AD-636 662 Field 11H, 17H
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
METHODS OF COMPLEX EVALUATION OF OPTICAL LUBRICANTS.
by R. A. Levento. 23 May 66, 15p FTD-TT-65-1506
TT-66-61948
Unedited rough draft trans. of Institut Neftekhimicheskoi i Gazovoi Promyshlennosti. Trudy (USSR) v44 p251-7 1963.

Descriptors: (*Lubricants, *Optical instruments), Tests, Oils, Contamination, Analysis, USSR.

Identifiers: Evaluation.

The recommended methods of complex laboratory evaluation of the lubricants for optico-mechanical instruments enable one to make a basic selection. The most important parameter which determines the specific properties of lubricants for optico-mechanical instruments is their tendency to the formation of oily deposits on optical parts. There are no satisfactory methods for laboratory evaluation of this index. (Author)

AD-636 663 Field 11H, 13H
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE EFFECT OF LUBRICANTS ON THE COLD ROLLING OF THIN STRIPS AND BELTS OF VT-14, VT-15, AND VT-16 TITANIUM ALLOYS.
by L. M. Pavlov, S. F. Burkhanov, E. R. Shor, E. E. Osinov, and A. M. Chinenov. 21 Mar 66, 14p FTD-TT-65-1955
TT-66-61949
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Chernava Metallurgiya (USSR) n9 p88-94 1964.

Descriptors: (*Rolling (Metallurgy), *Titanium alloys), (*Lubricants, Rolling (Metallurgy)), Cold working, Effectiveness, Vegetable oils, Fatty acid esters, Foils, Esters, Surface-active substances.

The most effective lubricant (of those investigated) during rolling of strips of VT-14, VT-15, and VT-16 down to a thickness of 0.8 mm is the synthetic lubricant LZ-203. Destruction (full or partial) of the metal is observed when strips thinner than 0.8 mm are rolled with lubricant LZ-203. The edges of the strips of alloy VT-14 are especially strongly destroyed. Caster oil is recommended as the lubricant for rolling very thin strips and foils of alloys VT-14, VT-15 and VT-16. Lubricants LZ-142 and LZ-142a, which are complex esters, turned out to have low effectiveness (during rolling of titanium alloy strips). An addition of surface-active substances (10 (oleic acid into lubricant LZ-142a) did not have a noticeable improving effect on this technical lubricant. In separate tests the oxide film formed on the surface of the investigated titanium alloys was observed to have lubricating properties. The possibility of producing a foil from the alloys VT-14, VT-15, and VT-16 was established. In this the strip thickness of 0.13 mm, which was obtained on a 'duo' 150 stand with the application of caster oil, is not the limiting possible thickness. The application of intermediate annealing and more advanced rolling equipment will allow us to produce a foil thinner than 0.1 mm. (Author)

N66-17358 Field 11H
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
BIBLIOGRAPHY ON SOLID LUBRICANTS, WITH INDEXES.
Feb 66, 34p NASA-SP-5037

Descriptors: *Abstract, *Bibliography, *Machining, *Solid lubricant.

For abstract, see T 66 18.

11I. PLASTICS

AD-636 651 Field 11I, 11D
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE NOTCHING EFFECT WITH GLASS FIBER REINFORCED PLASTICS.
by W. Felde. 25 May 66, 21p FTD-TT-65-1842
TT-66-61940
Unedited rough draft trans. of Plaste und Kautschuk (East Germany) v11 n10 p609-13 1964.

Descriptors: (*Plastics, Composite materials), (*Composite materials, Notch sensitivity), (*Glass textiles, Composite materials), Reinforcing materials, Anisotropy, East Germany.

The notch effect for anisotropic materials, especially glass fiber reinforced materials (GFP), is investigated and compared with the known results for isotropic materials.

AD-636 701 Field 11I, 7C
CFSTI Prices: HC$1.00 MF$0.50
Resin Research Labs., Inc., Newark, N. Y.
RESEARCH ON HALOGENATED ORGANOMETALLIC POLYMERS.
Final state rept., 5 Feb-5 Nov 65, 17 Nov 65, 18p Rept. no. 65-345
Contract NObs-92238

Descriptors: (*Fire-resistant materials, *Plastics), (*Metalorganic compounds, *Polymers), Phosphonium compounds, Chlorides, Zirconium compounds, Titanium compounds, Condensation reactions, Elimination reactions, Hydrolysis, Solubility, Thermal stability, Melting point, Molecular structure, Molding materials, Additives.

Identifiers: Fillers, Phospho-zirconium polymers.

A polymer derived from the condensation of Tetramethylol phosphonium chloride and a tetravalent zirconium compound was developed. This phospho-zirconium polymer (P-Z) was shown to have fire retardant qualities equivalent to those of antimony oxide. Two-phase elimination techniques were employed for synthesis. Initial studies indicated that the titanium analogs of the P-Z polymer were too unstable hydrolytically to be employed. However, the relative stability of the zirconium compound was good. Initial characterization indicated that the structure of the P-Z polymer is far more complex than would be expected on the basis of theoretical prediction. For example, the polymer appears to be water-soluble, yet its melting point is in excess of 250C. Excellent results were shown in the use of the P-Z polymer as a filler (50%) in compression moldings. Self-extinguishing pieces are realized. (Author)

AD-636 715 Field 11I
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
A METHOD OF PREPARING POROUS LAMINATES UTILIZING PREIMPREGNATION TECHNIQUES.
Technical rept.
by James T. Hill, and Henry Mouhot. Jun 66, 15p TR-6612
Proj. DA-3A025601A821-01

Descriptors: (*Laminated plastics, Porous materials), Epoxy plastics, Impregnation, Solvents, Evaporation, Compressive properties, Aging (Materials).

A procedure for preparing epoxy porous laminates utilizing preimpregnation and evaporation of solvent prior to layup is described. This technique results in stronger, more porous, and more reproducible properties of laminates. (Author)

N66-18312 Field 11I
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EXPERIMENTAL EVALUATION OF VARIOUS NONMETALLIC ABLATIVE MATERIALS AS NOZZLE SECTIONS OF HYDROGEN-OXYGEN ROCKET ENGINE.
by R. J. Rollbuhler, R. J. Salmi, and A. Wong. Mar 66, 28p NASA-TN-D-3258

Descriptors: *Ablating material, *Nonmetal, *Rocket nozzle, *Materials erosion.

For abstract, see T 66 18.

AD-465 689 **See Field 20K**

AD-636 412 **See Field 8A**

AD-636 714 **See Field 6E**

AD-636 716 **See Field 6L**

AD-636 728 **See Field 15E**

11J. RUBBERS

AD-636 454 Field 11J, 5C, 7A
CFSTI Prices: HC$7.10 MF$1.75
Aerospace Information Div., Library of Congress, Washington, D. C.
DEVELOPMENT OF THE RUBBER INDUSTRY IN THE USSR 1950-1960: COMPREHENSIVE REPORT.
20 Apr 64, 406p AID-U-64-26
TT-66-61893

Descriptors: (*Rubber, *Industries), USSR, Commerce, Synthetic rubber, Synthesis (Chemistry), Vulcanization, Physical properties, Plasticizers, Industrial plants, Production.

The submitted report on the development of the rubber industry in the USSR since 1950 is general in design due to the scope of the topic. It was compiled to a great extent on the basis of individual papers published in nonspecialized periodicals and is necessarily incomplete. More information could be obtained from the transactions (trudy) of individual specialized institutes, and the unfortunate fact that these transactions are not available cannot be sufficiently emphasized. The review of the development of studies on rubber can as yet not fully reflect the present state of rubber research in the USSR because its scope and rate have considerably increased in 1959 and the results of many studies have not yet been published. Academician V. A. Kargin states, for instance, that the scope of studies in the USSR on high molecular compounds has increased by 2.5 to 3 times in 1959. The most salient feature of the open literature data is the scarcity of studies on special purpose rubbers. It must be stressed, however, that many studies on these rubbers are not available; for instance, those conducted at the VNIISK by N. P. Apukhtina and other scientists mentioned by Soviet authors. The transactions of the VNIISK could provide very valuable information on the work of this Institute. It is possible that some new materials for special purposes are being already produced on a semi-industrial scale by the Experimental Plant of the VNIISK or by other special plants. (Author)

AD-636 327 **See Field 20K**

11L. WOOD AND PAPER PRODUCTS

PB-170 698 Field 11L
CFSTI Prices: HC$8.50 MF$2.25
Washington State Univ., Pullman. Wood Technology Section.
PROCEEDINGS OF SYMPOSIUM ON NONDESTRUCTIVE TESTING OF WOOD (2nd).
by William L. Galligan. Apr 65, 550p
Grant NSF-GK-160

Descriptors: (*Wood, Non-destructive testing), (*Non-destructive testing, Wood), Symposia, Test methods, Mechanical properties, Piezoelectric effect, Ultrasonic radiation, Moisture, Radiography, Elasticity, Tensile properties, Stresses, Rupture.

CONTENTS: A view of nondestructive testing from science to the marketplace; Fundamentals of nondestructive testing; Research and development for nondestructive testing; Elasticity vs. strength relationships for lumber; Status of nondestructive testing for wood.

AD-636 412 **See Field 8A**

AD-637 113 **See Field 13D**

12A. MATHEMATICS AND STATISTICS

AD-426 174 Field 12A
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.
CLOSURE TECHNIQUES FOR INFINITE SYSTEMS OF DIFFERENTIAL EQUATIONS.
by Richard Bellman, and John M. Richardson.
Nov 63, 13p RM-3821-ARPA

Descriptors: (*Nonlinear differential equations, Numerical analysis), Series, Integrals, Partial differential equations.

In some recent papers, various closure techniques have been applied to the problem of obtaining approximate solutions of nonlinear differential equations. These questions fall within the area of differential approximation. In this paper, the case where the original system is infinite dimensional and the approximating system is to be finite dimensional is considered. Infinite dimensional systems arise in a natural fashion from the consideration of partial differential equations.

AD-444 517 Field 12A
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.
IDENTIFICATION OF LINEAR SYSTEMS VIA NUMERICAL INVERSION OF LAPLACE TRANSFORMS.
by R. Bellman, H. Kagiwada, and R. Kalaba. Aug 64, 12p RM-4262-PR
Contract AF 49 (638)-700

Descriptors: (*Adaptive control systems, Integral transforms), Linear systems, Numerical methods + procedures, Differential equations, Least squares method.

A fundamental problem in adaptive control, and elsewhere in science, is that of identifying the parameters of a system on the basis of observations of a process which the system undergoes. The quasilinearization technique provides a general method for doing this, whether the system is linear or not. This Memorandum introduces a new method for identifying linear systems based upon the ability to invert Laplace transforms numerically. The method employs irregularly spaced observations and is extremely fast. Results of a test calculation for a second-order linear system are given. (Author)

AD-444 518 Field 12A
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.
OSCILLATORY AND UNIMODAL PROPERTIES OF SOLUTIONS OF SECOND ORDER LINEAR DIFFERENTIAL EQUATIONS.
by Richard Bellman. Aug 64, 15p RM-4104-PR
Contract AF 49 (638)-700
N64-33 233

Descriptors: (*Differential equations, Functions), Theorems, Integrals.

This paper demonstrates a Sturm oscillation theorem and the unimodal property of the solution in analogous fashion, under the assumption that $p(x) > 0$. (Author)

AD-469 635 Field 12A
CFSTI Prices: HC$3.60 MF$0.50
RAND Corp., Santa Monica, Calif.
CORRELATION IN A BIVARIATE NORMAL DISTRIBUTION WHEN THE CONDITIONAL VARIANCES ARE KNOWN.
by S. James Press. Aug 65, 30p P-3213

Descriptors: (*Correlation techniques, Distribution theory), Statistical analysis, Statistical distributions, Transcendental functions, Statistical tests, Analysis of variance.

The paper considers the problems of estimation and hypothesis testing for the correlation coefficient in a non-singular bivariate normal distribution when the conditional variances are known. Such problems arise, for example, when each of the variables can be measured by an instrument, with the other variable held fixed, and the instruments. It is shown that the statistic of interest in this problem is the sample covariance, v. The distribution of v is derived, in addition to its moments, some properties, and its asymptotic behavior. Some percentage points of the null distribution are tabulated. It is shown that the distribution has the monotone likelihood ratio property in the correlation coefficient parameter, rho. Uniformly most powerful level alpha tests of rho are given, and the distribution of the maximum likelihood estimator of rho is developed. (Author)

AD-636 345 Field 12A
California Univ., Riverside.
GENERALIZED COMMUTATIVE RINGS.
by L. P. Belluce, I. N. Herstein, and S. K. Jain.
16 Nov 64, 6p
Grants NSF-GP-2424, NSF-GP-1447
AROD-4197:7
Prepared in cooperation with Chicago Univ., Ill.

Descriptors: (*Rings (Mathematics), Theory), Algebra.

For abstract, see T 66 18.

AD-636 416 Field 12A
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
ASYMPTOTIC DISTRIBUTION OF MAXIMUM LIKELIHOOD ESTIMATORS IN LINEAR MODELS WITH AUTOREGRESSIVE DISTURBANCES.
by Clifford Hildreth. Jul 66, 28p RM-5059-PR
Contract AF 49 (638)-1700

Descriptors: (*Distribution theory, *Model theory), Statistical analysis, Statistical distributions.

Hildreth and Lu proposed a method for obtaining maximum likelihood estimates of linear model coefficients whose disturbances are generated by a stationary linear first-order autoregressive process with unknown autoregression coefficient. Until the present study was performed, consistency was the only property that had been shown for these estimates. This memorandum shows that the estimates of coefficients of independent variables and the estimate of the autoregression coefficient have a limiting joint multivariate-normal distribution, with the estimate of autoregression distributed independently of the estimates of coefficients of independent variables. This asymptotic covariance matrix of these latter estimates is the same as that of the best linear unbiased estimates for a model in which the autoregression coefficient is known. (Author)

AD-636 424 **Field 12A, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Ballastic Research Labs., Aberdeen Proving Ground, Md.
A NUMERICAL PROCEDURE TO DETERMINE THE STATES OF COEXISTING PHASES FROM EQUATIONS OF STATE.
Memorandum rept.
by Palmer R. Schlegel. Nov 65, 16p BRL-MR-1751
Proj. RDT/E-1P014501A14B

Descriptors: (*Numerical methods + procedures, *Phase studies), (*Equations of state, Phase studies).

A numerical solution of the states of coexisting phases from the theoretical equations of state was desired by the Exterior Ballistics Laboratory of the Ballistic Research Laboratories. In this report a numerical procedure for obtaining approximate solutions is described in detail for two specific functions; the method could be applied to general equations of state to obtain solutions to the problem. (Author)

AD-636 439 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
ON THE MAXIMUM DEVIATION OF THE SAMPLE DENSITY.
Technical rept.
by Michael Woodroofe. 20 Apr 66, 28p TR-114
Contract Nonr-225 (52)
Proj. NR-342 022

Descriptors: (*Distribution theory, *Sampling), Stochastic processes, Statistical analysis.

The maximum relative deviation of a sample density from the true one is shown to be relatively stable as the sample size tends to infinity provided both the sample and true densities are sufficiently regular. Conditions are given under which the sample density converges to the true density w.p. one uniformly on compact sets and uniformly on compact sets at a specified rate. The key to establishing this result is a theorem on the large deviations of independent, identically distributed bivariate random variables. (Author)

AD-636 519 **Field 12A**
CFSTI Prices: HC$5.00 MF$1.00
Philco Corp., Blue Bell, Pa. Communications and Electronics Div.
ADAPTIVE MODELLING OF LIKELIHOOD CLASSIFICATION-I.
Final rept., 13 Jan 65-13 Jan 66.
by Laveen N. Kanal, Kenneth Abend, Thomas J. Harley, and Jerry R. Richards. Jun 66, 185p
Philco-B008
Contract AF 30 (602)-3623
Proj. AF-5581
Task 558104
RADC-TR-66-190

Descriptors: (*Pattern recognition, *Decision theory), (*Statistical functions, Adaptive systems), Model theory, Classification.

The purpose of this study is the development and evaluation of adaptive networks to represent broad classes of likelihood functions. Orthogonal expansions for multivariate distributions of discrete and continuous random variables are investigated for this application. To overcome the problem of high dimensionality, Markovian processing of discrete spatial patterns is introduced. In addition, adaptive threshold adjustment procedures and an optimal method for taking context into account are derived from Compound Decision Theory. Experimental results, on the classification of visual patterns by a two-layer, two threshold network, are also presented. (Author)

AD-636 552 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Ford Motor Co., Dearborn, Mich.
SOME TEST FUNCTIONS FOR THE PARAMETERS OF THE WEIBULL DISTRIBUTIONS.
by Satya D. Dubey. Jun 66, 17p
Pub. in Naval Research Logistics Quarterly v13 n2, NAVSO-1278 p113-28 Jun 1966.

Descriptors: (*Statistical distributions, *Statistical functions), Statistical tests, Sampling.

Test functions, based on various types of censored and noncensored data, for testing several hypotheses about the location, the scale, and the shape parameters of the Weibull distributions are proposed. The exact sampling distributions of these test statistics are derived and their properties in special cases are discussed. A numerical example is considered to illustrate the application of the test functions. The results of this paper possess good possibility of wide application in view of the fact that hosts of real data arising from diverse fields of human endeavor are adequately described by the Weibull distribution. (Author)

AD-636 595 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THEOREMS ABOUT THE BEHAVIOR OF THE GREEN FUNCTION OF A FINITE ANALOG OF THE STURM-LIOUVILLE BOUNDAR PROBLEM AND THEIR APPLICATION TO THE STUDY OF DIFFERENTIAL EQUATIONS.
by A. L. Teptin, and N. N. Yuberev. 26 May 66, 29p FTD-HT-66-209
TT-66-61910
Unedited rough draft trans. of Sibirskii Matematicheskii Zhurnal (USSR) v5 n5 p1163-80 1964.

Descriptors: (*Theorems, *Green's function), (*Differential equations, *Functional analysis), Boundary value problems, USSR.

For abstract, see T 66 18.

AD-636 615 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
LINEARIZATION BASED UPON DIFFERENTIAL APPROXIMATION AND GALERKIN'S METHOD.
by Richard Bellman, and John M. Richardson. Jul 66, 17p RM-4614-PR
Contract AF 49 (638)-1700

Descriptors: (*Numerical methods and procedures, *Differential equations), Boundary value problems, Approximation (Mathematics).

A new linearization technique is described, based on differential approximation to ordinary differential equations of deterministic type. Simpler and more flexible than linearization procedures used previously, the method provides for finding first the approximating linear equation and then the approximating solution. Comparison is made with Galerkin's method, in which the process is essentially reversed, and an associated linear equation is deduced from an approximate solution. (Author)

AD-636 709 **Field 12A**
Brown Univ., Providence, R. I. Div. of Applied Mathematics.
LIAPUNOV'S SECOND METHOD.
by J. P. Lasalle. 1966, 12p
Contract DA-31-124-ARO (D)-270, Grant AF-AFOSR-693-65
AROD-5145:6
Grant NGR-40-002-015, Contract NAS-8-11264.

Descriptors: (*Functional analysis, Theory), Stability, Differential equations.

Identifiers: Lyapunov method.

For abstract, see T 66 18.

AD-636 718 **Field 12A**
CFSTI Prices: HC$27.10 MF$1.50
TRW Space Technology Labs., Inc., Los Angeles, Calif.
TABLES OF UPPER CONFIDENCE LIMITS ON FAILURE PROBABILITY OF 1, 2 AND 3 COMPONENT SERIAL SYSTEMS. VOLUME II.
by M. Lipow, and J. Riley. Apr 60, 275p TR-59-0000-00756-Vol-2
See also AD-609 100.

Descriptors: (*Statistical analysis, Tables), (*Reliability (Electronics), Statistical analysis), Failure (Mechanics), Probability, Propulsion, Reliability.

For abstract, see T 66 18.

AD-636 737 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
Picatinny Arsenal, Dover, N. J. Ammunition Engineering Directorate.
ESTIMATING THE MEAN AND STANDARD DEVIATION FROM A BRUCETON STATISTICAL ANALYSIS.
Technical rept.
by Leonard Shainheit. Aug 66, 59p
PA-TR-3413

Descriptors: (*Statistical analysis, *Numerical methods and procedures), Iterative methods, Measure theory.

The maximum likelihood equations used to determine estimates of the mean and standard deviation for the Bruceton method of statistical analysis were solved numerically. A digital computer algorithm was developed to reduce the time associated with the numerical calculations. The method of successive approximations (Newton-Raphson method) was suitable. Test data was evaluated to determine the relative difference between values of the means and standard deviation as obtained from the numerical solution of the maximum likelihood equations and as obtained from formulae approximating these equations. Results of the analysis showed that the differences between means were slight while those between standard deviations were more pronounced. Calculated high and low probability levels, because of their dependence on the mean and standard deviation, differed widely from one method of calculation to the other. The analysis also showed that the most adverse effects occurred for the smallest samples. Because the maximum likelihood equations yield better estimates of the mean and standard deviation than can be obtained from equations approximating them -- especially for small samples -- solution of the maximum likelihood equations by the Newton-Raphson method is advocated for determining the best estimates of the population mean and standard deviation. (Author)

AD-636 738 **Field 12A, 9B, 14D**
CFSTI Prices: HC$6.00 MF$1.25
Naval Weapons Lab., Dahlgren, Va.

DA-MRCA: A FORTRAN IV PROGRAM FOR MULTIPLE LINEAR REGRESSION.
Technical rept.
by K. Abt, G. Gemmill, T. Herring, and R. Shade.
Mar 66, 204p NWL-2035
Proj. 29Y

Descriptors: (*Programming (Computers), *Statistical analysis), Correlation techniques, Mathematical models, Programming languages, Reliability.

Identifiers: DA-MRCA, FORTRAN, Regression analysis.

This report contains the documentation of a multiple linear regression program for up to 50 independent variables, written in FORTRAN IV for the IBM 7030 (STRETCH) computer. The program incorporates part of the results obtained from an effort to explore the present limitations of high speed computation in the area of linear statistical models. DA-MRCA includes options for both forward and backward automatic ranking of the independent variables by order of prediction power for the dependent variable. The report contains the description of these options, along with an outline of the applicability of the program which includes, in a convenient form, non-orthogonal analysis of variance. Justifications are given for extensive checks made on the accuracy of the matrix inversions. The resulting internal decisions and their effects on the computational flow are described in detail. Also, a failure analysis is given in which causes for failures to obtain acceptable inverses and possible consequences of corrective measures are discussed. (Author)

AD-636 744 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
INFINITELY DIVISIBLE POINT PROCESSES IN Rn.
Technical rept.
by JayR. Goldman. 4 May 66, 24p TR-6
Contract Nonr-1866 (37)
Proj. NR-042-097
Prepared in cooperation with Princeton Univ., N. J., sponsored by an ARO (D) contract.

Descriptors: (*Stochastic processes, *Distribution theory), Measure theory.

Recent work on infinitely divisible point processes on the line is generalized to Rn. Two special classes of infinitely divisible point processes, regular and singular processes, are singled out by dependency relations among disjoint sets of Rn. Every stationary infinitely divisible point process is the superposition of a regular and a singular process and all regular processes can be realized as Poisson cluster processes. (Author)

AD-636 745 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
UPPER AND LOWER PROBABILITIES INDUCED BY A MULTI-VALUED MAPPING.
Technical rept.
by A. P. Dempster. 15 Jul 66, 36p TR-9
Contract Nonr-1866 (37)
Proj. NR-042-097

Descriptors: (*Probability, Theory), Mapping (Transformations), Statistical analysis, Set theory.

A multivalued mapping from a space X to a space S carries a probability measure defined over subsets of X into a system of upper and lower probabilities over subsets of S. Some basic properties of such systems are explored. Other approaches to upper and lower probabilities are possible and some of these are related to the present approach. A distinctive feature of the present approach is a rule for conditioning, or more generally, a rule for combining sources of information. Finally, the context in statistical inference from which the present theory arose is sketched briefly.

AD-636 747 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
HYPOTHESIS TESTING WHEN THE SAMPLE SIZE IS TREATED AS A RANDOM VARIABLE.
Technical rept.
by D. J. Bartholomew. 8 Jun 65, 38p TR-4
Contract Nonr-1867 (37)
Proj. NR-042-097

Descriptors: (*Statistical tests, Theory), Sampling, Stochastic processes, Monte Carlo method.

In the Neyman-Pearson theory of hypothesis testing it is customary to calculate significance levels and power functions on the assumption that the sample size is fixed. The main purpose of this paper is to propagate the view that the restriction of the theory to reference sets in which the sample size is constant is neither necessary nor desirable. The paper falls into two parts. In the first we consider the test of a simple null hypothesis versus a simple alternative. In this case it is pointed out that the optimum test requires the rejection of the null hypothesis if the likelihood ratio is less than a constant, K, which is independent of n, the sample size. In this respect it is identical with Bayesian and likelihood methods of dealing with the same problem. Two methods for determining a suitable value for K in the absence of knowledge about the distribution of sample size are proposed. These ideas are extended, in the second part of the paper, to the case of a simple null hypothesis and a composite alternative. Since no uniformly most powerful test exists, a variety of tests suggested by Bayesian and likelihood considerations are compared from a frequentist point of view. This work is exploratory, being based on numerical calculations, but provides a partial justification for treating sample size as if it were fixed. (Author)

AD-636 826 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE METHOD OF LINES FOR NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS.
by Tadeusz Leser, and John T. Harrison. Mar 66, 30p BRL-R-1311
Proj. RDT/E-1P014501A14B

Descriptors: (*Numerical methods + procedures, *Partial differential equations), Boundary value problems.

In the method of lines for solving certain kinds of boundary value problems in rectangular or trapezoidal regions one of the variables, say y, is discretized while the other variable x is left continuous. When suitable finite difference approximations are substituted for the partial derivatives with respect to y the differential equation is changed into a simultaneous system of ordinary differential equations in the variable x. The method used very little in the USA is used extensively in the Soviet Union and nearly all the literature on this subject is in Russian. The method has been tried in BRL and it seems to be a very useful one. This report does not pretend to be a monograph on the subject. It intends to be a practical guide to computations. (Author)

AD-636 861 **Field 12A**
Army Biological Labs., Frederick, Md.
STATISTICS IN ARMY RESEARCH DEVELOPMENT AND TESTING.
by Clifford J. Maloney. 1962, 5p

Descriptors: (*Statistical analysis, *Army research), Quality control.

For abstract, see T 66 18.

AD-636 922 **Field 12A, 13H, 11E**
CFSTI Prices: HC$1.00 MF$0.50
Cornell Univ., Ithaca, N. Y. Dept. of Industrial Engineering and Operations Research.
A TWO-STAGE SUBSAMPLING PROCEDURE FOR RANKING MEANS OF FINITE POPULATIONS WITH AN APPLICATION TO BULK SAMPLING PROBLEMS.
Technical rept.
by Robert E. Bechhofer. May 66, 23p TR-5
Contract Nonr-401 (53)
Projs. NR-042-244, RR-003-05-01

Descriptors: (*Sampling, Population (Mathematics)), Decision theory, Quality control.

It is assumed that there are available k finite populations, each consisting of U primary units, and that each primary unit can be subdivided into T elements. It is further assumed that the populations have a common known variance among primary units, and a common known variance among elements within primary units. The values of the overall population means per element are assumed to be unknown, as is the true pairing of the ranked values of these means with the populations. It is desired to select the population which has the largest overall population mean per element. This selection is to be accomplished by taking a random sample of u U primary units from each population, and then a random sample of t T elements from each primary unit. The pair (t,u) is to be chosen in such a way as to guarantee that the probability of a correct selection will be equal to or greater than a specified quantity whenever the true difference between the largest and second largest overall population mean per element is equal to or greater than a second specified quantity. In general several different pairs (t,u) will accomplish the stated objective. It is proposed that a choice be made among these pairs using the criterion of minimum total cost of sampling. This formulation leads to an integer programming problem with a non-linear constraint. An especially simple method of solving this problem is proposed, and this method is contrasted with certain other methods which have been considered in the literature. It is shown how the subsampling ranking procedure described in this paper can be applied to a bulk sampling problem involving the clean content of wool in bales. (Author)

AD-636 931 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
EXTENSION OF AN EIGENVALUE ESTIMATION METHOD OF D. H. WEINSTEIN.
Technical memo.
by J. T. Stadter. Mar 66, 24p TG-803
Contract NOw-62-0604

Descriptors: (*Operators (Mathematics), *Numerical methods and procedures), Functional analysis, Calculus of variations.

Identifiers: Weinstein's method, Eigenvalues.

A procedure developed by D. H. Weinstein for calculating bounds to eigenvalues of self-adjoint operators is formulated as a variational method. The procedure is then extended to take advantage of the properties of operators of the form T*T. (Author)

AD-636 940 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Naval Postgraduate School, Monterey, Calif.
AN ITERATIVE SOLUTION TO THE GENERALIZED EIGENVALUE-EIGENVECTOR PROBLEM.
Technical rept/research paper.
by R. D. Brunell. Jul 66, 51p TR/RP-69

Descriptors: (*Iterative methods, *Matrix algebra), Complex variables, Programming (Computers), Numerical analysis, Polynomials.

Identifiers: Eigenvalues, CDC-1604.

This paper presents an approach to the solution of what is usually called 'the generalized eigenvalue problem.' The basic format of the method is similar to that presented by I. Tarnove, but with revisions in the root-finding and scaling procedures. The capability of calculating the associated eigenvectors has also been added to the previously-published algorithm. This method uses an iterative root-finding technique and will converge with almost any first estimate. To preserve accuracy, the original matrix is used throughout for the evaluation of the function and scaling is done by powers of two. A FORTRAN-63 program for the CDC-1604, using this method, has been written for matrices having polynomial elements. The code was evaluated using a number of trial problems, including pathological matrices, and some of these results have been incorporated into this report. (Author)

AD-636 986 **Field 12A, 16B**
CFSTI Prices: HC$2.00 MF$0.50
Pacific Missile Range, Point Mugu, Calif.
ERROR-BOUND METHODS FOR MULTIPLE-STATION DATA REDUCTION.
Technical memo.
by R. W. Claassen, and C. J. Thorne. 5 Jul 66, 42p
PMR-TM-66-2A

Descriptors: (*Least squares method, *Tracking), Programming (Computers), Errors, Trajectories.

A computer program and the related mathematical analysis is given for the calculation of accuracy bounds for the position of an object in space. The method involves the reduction of data from n-stations using the present PMR least-squares n-station method. (Author)

AD-636 991 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Applied Mathematics.
MATERIAL SYMMETRY RESTRICTIONS FOR CERTAIN LOCALLY COMPACT SYMMETRY GROUPS.
Technical rept.
by John S. Lew. Jul 65, 35p TR-101
Contract Nonr-562 (10)
Proj. NR-064-406

Descriptors: (*Measure theory, *Groups (Mathematics)), Topology, Functions.

For compact symmetry groups, Wineman and Pipkin have shown that the canonical forms obtained for form-invariant polynomials apply to all form-invariant functions. By a topological ergodic theorem, we construct a group average for bounded representations of those locally compact groups we call mean-ergodic, and for these groups thereby show that the form-invariant polynomials are dense among the form-invariant continuous functions. For representations with closed S-orbits we can characterize all invariant functions, and for Lindelof such groups we can characterize all form-invariant functions, thereby showing again under broader hypotheses that integrity bases are functional bases. (Author)

AD-637 063 **Field 12A**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
LORENTZ-COVARIENT GRAVITATIONAL ENERGY-MOMENTUM LINKAGES.
by J. Winicour, and L. Tamburino. 29 Jun 65, 10p
ARL-66-0041
Proj. AF 7114

Descriptors: (*Topology, Transformations (Mathematics)), Gravity, Energy, Momentum.

This letter presents a gravitational energy-momentum expression with the transformation properties of a Lorentz free vector in asymptotically flat but radiative spaces. This expression and its transformation properties apply to finite regions as well as to the entire space. (Author)

AD-637 069 **Field 12A**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
APPROXIMATE SOLUTION OF HILL'S EQUATION.
by Herbert Payne. 1 Feb 65, 9p ARL-66-0056
Proj. AF-7112
Task 711201

Descriptors: (*Differential equations, Numerical analysis), Partial differential equations, Band theory of solids.

A modified WKB approximation, amenable to successive corrections, to the solution of the linear differential equation of second order having a periodic coefficient in normal form is presented. Considered as an application of the related equation method, it uses the free-particle wave equation rather than, as in an alternative approach, Mathieu's equation. Particular attention is given the instances, where two simple turning points appear in the period and where there are no turning points. With respect to the one-dimensional crystal, it is shown how the energy band structure can be gleaned directly from the given-periodic potential. (Author)

AD-637 073 **Field 12A**
Midwest Research Inst., Kansas City, Mo.
ASYMPTOTIC EXPANSIONS OF A CLASS OF HYPERGEOMETRIC POLYNOMIALS WITH RESPECT TO THE ORDER-III.
by Jerry L. Fields. 1965, 13p
Contract AF 33 (657)-8872
Proj. AF-7071
ARL-66-0079

Descriptors: (*Asymptotic series, *Polynomials), Special functions (Mathematical).

For abstract, see T 66 18.

AD-637 077 **Field 12A**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
MAXIMUM-LIKELIHOOD ESTIMATION OF THE PARAMETERS OF GAMMA AND WEIBULL POPULATIONS FROM COMPLETE AND FROM CENSORED SAMPLES.
Revised ed.
by H. Leon Harter, and Albert H. Moore. Apr 65, 9p ARL-65-275
Proj. AF-7071
Task 707111
Revision of manuscript submitted Dec 1964.

Descriptors: (*Statistical analysis, *Population (Mathematics)), Iterative methods, Statistical distributions, Sampling, Statistical functions.

Iterative procedures are given for joint maximum-likelihood estimation, from complete and censored samples, of the three parameters of Gamma and of Weibull populations. For each of these populations, the likelihood function is written down, and the three maximum-likelihood estimators for the three parameters. The iterative procedures proposed to solve the equations are applicable to the most general case, in which all three parameters are unknown, and also to special cases in which any one or any two of the parameters are known. Numerical examples are worked out in which the parameters are estimated from the first m failure times in simulated life tests of n items ($m < n$), using data drawn from Gamma and Weibull populations, each with two different values of the shape parameter. (Author)

AD-637 120 **Field 12A**
CFSTI Prices: HC$4.00 MF$0.75
Aerospace Research Labs., Office of Aerospace Research, Wright Patterson AFB, Ohio.
TEN PLACE TABLES OF THE JACOBIAN ELLIPTIC FUNCTIONS. II. THETA FUNCTIONS AND CONVERSION FACTORS.
Scientific rept.
by Henry E. Fettis, and James C. Caslin. Apr 66, 118p ARL-66-0069
Proj. AF-7071

Descriptors: (*Tables, *Functions), Complex variables, Integrals.

Identifiers: Jacobian elliptic functions, Theta functions.

The report gives tables of the Theta Function theta (u,k) in Jacobi's notation, together with certain conversion factors which depend only on k and which enable all of the remaining Jacobian Theta Functions to be found with the aid of the Tables of Part I (AD-631 869).

AD-637 123 **Field 12A, 9B**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
SOME REMARKS ON ACCEPTABLE SETS OF NUMBERS.
by M. P. Schutzenberger. Aug 66, 11p P-3413
For presentation at the Symposium on Algebraic Theory of Automata, to be held in Berkeley, September, 1966.

Descriptors: (*Mathematical logic, *Automata), Set theory, Number theory, Decision theory, Monoids, Context free grammars.

For abstract, see T 66 18.

AD-637 127 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Naval Weapons Lab., Dahlgren, Va.
MODELS FOR MATHEMATICAL SYSTEMS.
Technical rept.
by Alfred H. Morris Jr. 30 Mar 66, 29p NWL-2032

Descriptors: (*Programming (Computers), *Algebras), (*Model theory, Algebras), Differential equations, Series.

The purpose of this paper is to describe and illustrate a program, written for the IBM 7090, which defines a model for a finite collection of algebras for the computer. It is shown that the program contains a structure broad enough in scope to allow one to perform operations on such diverse mathematical concepts as differential equations, infinite series, and differential forms in a simple yet comprehensive manner, while also serving as a foundation upon which a variety of higher-level symbolic manipulation languages can be developed. (Author)

ANL-7126 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
THE NUMERICAL INTEGRATION OF ORDINARY DIFFERENTIAL EQUATIONS OF VARIOUS ORDERS.
by C. W. Gear. Jan 66, 34p
Contract W-31-109-eng-38

Descriptors: (*Differential equations, Integration), (*Numerical methods and procedures, Differential equations).

For abstract, see N 20 16.

N66-10902 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
SUBJECTIVISTIC INTERPRETATION OF CONFIDENCE REGIONS.
by P. Ihm. Jun 65, 8p
EUR-1623.D

Descriptors: *Confidence limit, *Probability theory.

N66-16484 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
Tokyo Astronomical Observatory (Japan).
A METHOD OF NUMERICAL SOLUTION OF INTEGRAL EQUATIONS WHOSE KERNELS HAVE ALMOST DIAGONAL FORMS.
by N. Sekiguchi. 1965, 16p Ann. Ser-2-vol-9, no. 2.

Descriptors: *Integral equation, *Kernel function, *Fredholm integral equation, *Mathematics (GEN), *Numerical analysis.

N66-16602 Field 12A
CFSTI Prices: HC$4.00 MF$0.75
Stanford Univ., Calif. Dept. of Statistics.
BOUNDS AND RATES OF CONVERGENCE FOR THE EXTENDED COMPOUND ESTIMATION PROBLEM IN THE SEQUENCE CASE.
Technical rept. no. 81.
by D. D. Swain. 17 Jul 65, 110p
Contract Nonr-225 (53)
NASA-CR-70147

Descriptors: *Bayesian statistics, *Convergence, *Decision theory, *Problem solving.

N66-16706 Field 12A
CFSTI Prices: HC$5.00 MF$1.00
Auburn Research Foundation, Inc., Ala. Servomechanisms Lab.
THE X-TRANSFORM AND ITS USE IN SAMPLED DATA SYSTEM ANALYSIS.
Technical rept no. 2.
28 Jun 65, 166p
Contract NAS8-11116
NASA-CR-70031

Descriptors: *Data control system, *Systems analysis, *Sampled data system, *Z transform.

N66-17091 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
ON THE NUMBER OF L2 SOLUTIONS OF - Y PLUS Q (T)Y EQUALS LAMBDA Y WHERE Q (T) IS COMPLEX VALUED.
by A. M. Krall. 1963, 9p
Grant NGR-39-009-041
NASA-CR-70329

Descriptors: *Complex variable, *Differential operator, *Problem solving.

N66-17092 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
ON THE EIGENVALUES OF A SINGULAR NONSELF-ADJOINT DIFFERENTIAL OPERATOR OF SECOND ORDER.
by A. M. Krall. 1965, 10p
Grant NGR-39-009-041
NASA-CR-70330

Descriptors: *Eigenvalue, *Problem solving, *Differential operator.

N66-17235 Field 12A
CFSTI Prices: HC$7.00 MF$2.00
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
HEXADECIMAL TO DECIMAL CONVERSION TABLES FOR HEXADECIMAL VALUES 0-3F,FFFF-DECIMAL VALUES 0-262,143.
by J. L. Maury Jr. Nov 65, 368p NASA-TM-X-55397, X-542-65-462

Descriptors: *Computer programming, *Conversion table, *Orbit calculation.

N66-17241 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE EFFECT OF ADDITIONAL OBSERVATIONS ON A PREVIOUS LEAST SQUARES ESTIMATE.
by R. V. Borchers. Dec 65, 17p NASA-TM-X-55409, X-547-65-497

Descriptors: *Least squares method, *Matrix algebra, *Recursion formula.

N66-18387 Field 12A
CFSTI Prices: HC$2.00 MF$0.50
Auckland Univ. (New Zealand). Radio Research Centre.
DIRECT MANUAL CALCULATIONS OF IONOSPHERIC PARAMETERS USING A SINGLE-POLYNOMIAL ANALYSIS.
by J. E. Titheridge. 1965, 40p
Grant NSg-54
NASA-CR-60514

Descriptors: *Ionosphere, *Electron density, *Polynomial.

AD-636 370 See Field 20J

AD-636 400 See Field 6D

AD-636 523 See Field 20D

AD-636 654 See Field 9E

AD-636 720 See Field 20I

AD-636 731 See Field 20D

AD-636 788 See Field 18F

AD-636 789 See Field 9D

AD-636 976 See Field 9B

AD-637 000 See Field 9B

12B. OPERATIONS RESEARCH

AD-410 768 Field 12B
CFSTI Price: HC$9.60
System Development Corp., Santa Monica, Calif.
PROCEEDINGS OF THE SYMPOSIUM ON OPERATIONS RESEARCH AT SDC: PART I, HISTORICAL PERSPECTIVE.
Technical memo.
by Claude Baum, and Doris Rhine. 13 Jun 63, 100p TM-1042/001/00

Descriptors: (*Operations research, Symposia), History, Systems engineering, Queueing theory.

AD-480 213 Field 12B
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Operations Research Center.
OPTIMUM POLICIES FOR PARTIALLY OBSERVABLE MARKOV SYSTEMS.
by James Steven Kakalik. Oct 65, 79p Technical rept. TR-18
Contract Nonr-3963 (06), DA-31-124-ARO (D)-209
Proj. NR-276-004, DSR-9493
Rept. on Proj. DSR-5217.

Descriptors: (*Operations research, Decision making), (*Statistical processes, Mathematical models), Optimization, Dynamic Programming, Numerical analysis, Information theory, Probability, Sequential analysis, Data transmission systems, Signal-to-noise ratio, Programming (Computers), Game theory, Transients, Cost effectiveness.

The primary area of investigation in this report is the selection of a course of action from a set of alternatives using only the information about the system which is available from the observable outputs. Associated with the model is a cost structure. The decision maker may use the observed outputs to make inferences about the underlying Markov state and will be assessed rewards or penalties depending on the true state of nature and on the action taken. The state of knowledge vector s (t) summarizes all that is known about the probability of the system being in each of the underlying states as a function of the observed outputs. The optimal policy will specify a course of action to be taken for each possible state of knowledge s (t) for all possible t. The policy depends on the decision-maker's knowledge of the underlying Markov state, on the cost structure associated with the model, and on the criterion of optimum used. Dynamic programming techniques are shown to be of use in the optimization of both transient and steady state policies. The analysis is conducted with the optional availability of a perfect information channel at added cost. Computer programs were written for policy evaluation and optimization, and specific numerical results are included in this report. (Author)

AD-636 451 Field 12B
CFSTI Prices: HC$1.00 MF$0.50
Operations Research Center, Univ. of Calif., Berkeley.
NOTES ON COVERING OF ARCS BY NODES IN AN UNDIRECTED GRAPH.
Research rept.
by Lars-Chr. Lorentzen. Jul 66, 20p ORC-66-16
Contracts Nonr-222 (83), Nonr-3656 (02)
Projs. NR-047-033, NR-041-275
Contract DA-31-124-ARO (D)-331, Grant NSF-GP-4593.

Descriptors: (*Linear programming, *Graphics), Algorithms, Numbers, Optimization, Operations research.

Identifiers: Integer programming.

Edmonds, Johnson, and Witzgall and Zahn have given efficient algorithms for the solution of the integer linear programming problem max z = ex s.t. Ex < f , x > 0 , x integer, where e and f are vectors with all components equal to one. (This is known as the maximum matching problem). Here the author considers 'the dual integer programming problem' (the minimal covering problem): min w = pi f s.t. pi E > e , pi integer. First a lower bound on the solution of the minimal covering is given. Then some 'cycle condition' is defined which, for some special kind of graphs (called bicactus), added as supplementary constraints to the linear programming problem will give an integer solution. Finally an algorithm is proposed to solve the minimal covering problem and a qualitative comparison of its efficiency with Gomory's method is done. (Author)

AD-636 452 Field 12B
CFSTI Prices: HC$2.00 MF$0.50
Operations Research Center, Univ. of Calif., Berkeley.
L-SHAPED LINEAR PROGRAMS WITH APPLICATIONS TO OPTIMAL CONTROL AND STOCHASTIC PROGRAMMING.
Research rept.
by R. M. Van Slyke, and Roger Wets. Jul 66, 33p ORC-66-17
Contract Nonr-222 (83), Grant NSF-GP-4593
Proj. NR-047-033
Grant PHS-GM-9606-05.

Descriptors: (*Linear programming, *Stochastic processes), (*Optimization, *Control), Algorithms, Operations research.

This paper gives an algorithm for L-shaped linear programs which arise naturally in optimal control problems with state constraints and stochastic linear programs (which can be represented in this form with an infinite number of linear constraints). The first section describes a cutting hyperplane algorithm which is shown to be equivalent to a partial decomposition algorithm of the dual program. The two last sections are devoted to applications

of the cutting hyperplane algorithm to a linear optimal control problem and stochastic programming problems. (Author)

AD-636 511 **Field 12B, 9B**
CFSTI Prices: HC$1.00 MF$0.50
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
THE FORMULATION OF SOME ALLOCATION AND CONNECTION PROBLEMS AS INTEGER PROGRAMS.
by Melvin A. Breuer. Mar 66, 14p
Grants AF-AFOSR-496-65, NFG-GP-2413
Pub. in Naval Research Logistics Quarterly NAVSO-P-1278 v13 n1 p83-95 Mar 1966. Prepared in cooperation with the California Univ., Berkeley.

Descriptors: (*Linear programming, Computer logic), (*Digital computers, Design), Numbers, Wiring diagrams, Modules (Electronics).

Identifiers: Integer programming.

In this paper a component placement problem and a digital computer backboard wiring problem are formulated as integer linear programs. The component placement problem consists of making a unique assignment of components to column positions such that wireability is maximized. The backboard wiring problem consists of three interrelated subproblems, namely, the placement, the connection, and the routing problems. The placement and connection problems are combined and solved as one, thereby giving the optimal circuit connections as well as minimizing the total lead length. It is shown that under certain assumptions, the number of inequalities and variables in the problem can be greatly reduced. Further simplifying assumptions lead to a near optimal solution. Examples of other allocation problems to which the models presented here are applicable are given. The following concepts are formulated as linear inequalities: (1) the absolute magnitude of the difference between two variables; (2) minimize the minimum function of a set of functions; and (3) counting the number of (0, 1) adjacent component pairs in a vector. (Author)

AD-636 513 **Field 12B, 5A**
CFSTI Prices: HC$1.00 MF$0.50
Princeton Univ., N. J.
A PRICE LEADERSHIP METHOD FOR SOLVING THE INSPECTOR'S NON-CONSTANT-SUM GAME.
by Michael Maschler. Mar 66, 24p
Prepared in cooperation with Hebrew Univ., Jerusalem. Supported in part by ONR and Carnegie Corp. N. Y. Pub. in Naval Research Logistics Quarterly NAVSO-P-1278 v13 n1 p11-33 Mar 1966.

Descriptors: (*Game theory, *Managment engineering), Optimization, Operations research.

An inspector's game is a non-constant-sum two-person game in which one player has promised to perform a certain duty and the other player is allowed to inspect and verify occasionally that the duty has indeed been performed. A solution to a variant of such a game is given in this paper, based on the assumption that the inspector can announce his mixed strategy in advance, if he so wishes, whereas the other player, who has already given his promise, cannot threaten by explicitly saying that he will not keep his word. (Author)

AD-636 514 **Field 12B**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., Berkeley.
MINIMUM-COST FLOWS IN CONVEX-COST NETWORKS.
by T. C. Hu. Mar 66, 10p
Supported in part by ONR, ARO (D), and NSF. Pub. in Naval Research Logistics Quarterly NAVSO-P-1278 v13 n1 p1-9 Mar 1966.

Descriptors: (*Linear programming, *Cost effectiveness), (*Operations research, Cost effectiveness), Electrical networks, Algorithms.

Identifiers: Max-flow min-cut theorem.

An algorithm is given for solving minimum-cost flow problems where the shipping cost over an arc is a convex function of the number of units shipped along that arc. This provides a unified way of looking at many seemingly unrelated problems in different areas. In particular, it is shown how problems associated with electrical networks, with increasing the capacity of a network under a fixed budget, with Laplace equations, and with the Max-Flow Min-Cut Theorem may all be formulated into minimum-cost flow problems in convex-cost networks. (Author)

AD-636 515 **Field 12B**
CFSTI Prices: HC$1.00 MF$0.50
Technion - Israel Inst. of Tech., Haifa.
SURVIVAL PROBABILITIES IN CROSSING A FIELD CONTAINING ABSORPTION POINTS.
by S. Zacks, and D. Goldfarb. 1966, 15p
Pub. in Naval Research Logistics Quarterly v13 n1 p35-48 Mar 1966.

Descriptors: (*Survival, *Probability), Operations research, Absorption.

For abstract, see T 66 18.

AD-636 516 **Field 12B, 15E**
CFSTI Prices: HC$1.00 MF$0.50
DePauw Univ., Greencastle, Ind.
ONE-PERSON GAMES OF ECONOMIC SURVIVAL.
by John E. Morrill. 1966, 22p
Pub. in Naval Research Logistics Quarterly v13 n1 p49-69 Mar 1966.

Descriptors: (*Game theory, Operations research), Logistics, Stock level control.

This paper discusses the one-person economic survival game model with a discrete probability distribution for the contribution to surplus variable. The general game model and strategies in these games are examined, and necessary conditions which an undominated, stationary strategy must satisfy are obtained. For a special class of these games a mathematical formulation of the value of the game is given, and examples and theorems which relate to undominated strategies in this class are presented. This paper, in some sense, is a sequel to a portion of a paper by Shubik and Thompson which appeared in this journal. (Author)

AD-636 535 **Field 12B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Industrial Engineering.
ON THE CONVERGENCE OF SOME FEASIBLE DIRECTION ALGORITHMS FOR NONLINEAR PROGRAMMING.
Technical rept.
by Donald M. Topkis, and Arthur F. Veinott Jr.
5 Aug 66, 27p TR-6
Contract Nonr-225 (77)
Proj. NR-347-010

Descriptors: (*Algorithms, *Nonlinear programming), Optimization.

Recently Goldstein has considered the problem of determining conditions on the selection of directions in feasible direction algorithms for unconstrained maximization problems which assure the gradient vanishes in the limit. This paper extends his work (when specialized to Euclidian spaces) in various ways, notably by considering constrained maximization problems and by allowing a wider choice in the selection of the step size. For example we allow the "optimal" step size among others. We give conditions on the directions which assure convergence to a stationary point in feasible direction algorithms for maximizing a real valued continuous function on a closed set. We also apply this result to establish convergence to a stationary point of several known methods (e.g., Cauchy's method of steepest ascents, the Newton-Raphson method, and frank and Wolfe's method), a simple variant of one of Zoutendijk's methods that eliminates the need for his "anti-zigzagging" procedures, and some new second order methods that require quadratic programs to be solved at each stage. (Author)

AD-636 549 **Field 12B**
CFSTI Prices: HC$1.00 MF$0.50
Columbia Univ., N. Y.
SURVEILLANCE OF MULTI-COMPONENT SYSTEMS: A STOCHASTIC TRAVELING SALESMAN'S PROBLEM.
by Cyrus Derman, and Mortin Klein. Jun 66, 10p
Contract Nonr-266 (55)
Pub. in Naval Research Logistics Quarterly v13 n2, NAVSO-P-1278 p103-11 Jun 1966.

Descriptors: (*Stochastic processes, *Linear programming), Search theory, Scheduling, Sampling, Maintenance.

Identifiers: Traveling salesman problem.

For abstract, see T 66 18.

AD-636 554 **Field 12B, 14A, 15E**
CFSTI Prices: HC$1.00 MF$0.50
FMC Corp., Santa Clara, Calif. Machinery/Systems Group.
USE OF DIMENSIONLESS RATIOS TO DETERMINE MINIMUM-COST INVENTORY QUANTITIES.
by David P. Herron. Jun 66, 11p
Pub. in Naval Research Logistics Quarterly v13 n2, NAVSO-1278 p167-176 Jun 1966.

Descriptors: (*Inventory analysis, *Cost effectiveness), Inventory control, Stock level control.

The iteration usually necessary for simultaneous determination of minimum-cost order quantity and reorder point in (Q, r) inventory systems may be eliminated by a graphical technique employing dimensionless ratios. This technique is illustrated for three different types of stock-out penalty. (Author)

AD-636 586 **Field 12B, 13F**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
MATHEMATICAL METHODS IN AUTO TRANSPORATION OF THE USSR.
by T. Dabrowski, J. Tarkowski, and M. Welzandt.
21 Feb 66, 32p FTD-TT-65-1267
TT-66-61905
Unedited rough draft trans. of Przeglad Komunikacyjny; Miesiecznik Ekonomicznotechniczny (Poland) n11 p412-20 1964.

Descriptors: (*Operations research, *Transportation), Passenger vehicles, USSR.

For abstract, see T 66 18.

AD-636 740 **Field 12B, 15E, 14D**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
NONOPTIMALITY OF PLANNED REPLACEMENT IN INTERVALS OF DECREASING FAILURE RATE.
by Eric V. Denardo, and Bennett L. Fox. Aug 66, 5p P-3419
Prepared for submission to Operations Research.

Descriptors: (*Replacement theory, *Failure (Mechanics)), Management planning, Logistics, Reliability.

For abstract, see T 66 18.

AD-636 358 See Field 17B

AD-636 411 See Field 15E

AD-636 497 See Field 14A

AD-636 551 See Field 15G

AD-636 960 See Field 13B

13A. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

AD-636 296 Field 13A, 13B, 8L
CFSTI Prices: HC$1.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
TUNNEL VENTILATION AND HEAT-LOAD SURVEY BYRD STATION, ANTARCTICA, 1965.
Technical rept.
by C. R. Hoffman. Jul 66. 22p TR-R-452
Proj. Y-F015-11-01-163

Descriptors: (*Underground structures, *Antarctic regions), (*Heating, Underground structures), (*Ventilation, Underground structures), Civil engineering, Snow, Structures, Temperature control.

Identifiers: Byrd Station.

A ventilation and heat-load survey was conducted in the undersnow tunnels at Byrd Station, Antarctica, in late December 1965. This work was performed to obtain current information on tunnel cooling requirements and to obtain data for tunnel cooling system design. The survey showed that average tunnel temperatures are 5 to 6F lower than during a similar survey conducted in 1963, but are still as much as 18F higher than the desired temperature of 0F. Doors originally installed at tunnel entrances have deformed and become inoperative, allowing the free circulation of warm surface air throughout the undersnow camp. It was concluded that tunnel temperatures in the undersnow camp can be reduced by installation of airtight bulkheads and suitable selfclosing doors to prevent the inflow of warm, surface air and reduce cross-circulation between tunnels. All tunnels except L-7, which contains the communications galley and generator buildings, can be adequately cooled by drawing cold air from tunnel walls. A cooling system based on the U. S. Naval Facilities Engineering Command's air-plenum concept appears to be the most suitable means of cooling tunnel L-7. (Author)

AD-636 990 Field 13A, 20M
CFSTI Prices: HC$3.00 MF$0.75
Garrett Corp., Los Angeles, Calif. AiResearch Mfg. Div.
PHASE I STUDIES FOR DEVELOPMENT OF HEAT POWERED ENVIRONMENTAL CONTROL UNITS.
by R. F. Smisek. 6 May 66. 91p AAC-66-0346
Contract DA-44-009-AMC-1504 (T)

Descriptors: (*Air conditioning equipment, *Thermodynamic cycles), Refrigeration systems, Thermodynamics, Gas turbines, Exhaust gases, Boilers, Heat exchangers, Refrigerant condensers.

A heat-powered environment control unit (ECU) is a system that uses energy in the form of heat to produce thermal conditioning of a fluid to be used for environmental control purposes. It is envisioned that the energy source for the heat-powered ECU will be the normally wasted heat contained in the exhaust gases of standard Army gas turbine generator sets. The results of the studies conducted are presented in Section 2 through 4. An investigation of various thermodynamic cycles which could be utilized in this application is presented in Section 2. Thermodynamic optimization of the heat-powered ECU is presented in Section 3; this section also includes selection of the basic thermodynamic cycle felt to be most suitable, selection of the working fluid, optimization of the operating cycle, and a discussion of refinements for the selected basic cycle which can be utilized to increase the thermodynamic efficiency. Section 4 presents discussions on optimizing the various hardware design approaches. The recommendations for the heat-powered environmental control unit, as determined by this study, are summarized. (Author)

NYO-187-7 Field 13A, 20M, 18I
CFSTI Prices: HC$5.00 MF$1.00
Columbia Univ., New York.
FORCED CONVECTION BOILING BURNOUT FOR WATER IN UNIFORMLY HEATED TUBULAR TEST SECTIONS.
Thesis.
by Jack Griffel. 25 May 65. 168p
Contract AT (30-3)-187

Descriptors: (*Convection (Heat transfer), Boiling), (*Burnthrough, Convection (Heat transfer)).

For abstract, see T 66 18.

N66-16569 Field 13A
CFSTI Prices: HC$3.00 MF$0.75
Pratt and Whitney Aircraft, East Hartford, Conn.
VAPOR-CHAMBER FIN STUDIES.
Quarterly rept. no. 1, 28 May-28 Aug 65.
by H. R. Kunz, and L. Langston. Sep 65. 85p
PWA-2698
Contract NAS3-7622
NASA-CR-54882

Descriptors: *Fin, *Heat transfer, *Power plant, *Space radiator.

AD-636 385 See Field 13H

AD-636 570 See Field 14B

PB-170 953 See Field 5C

13B. CIVIL ENGINEERING

AD-636 810 Field 13B, 20D, 8C, 15G K
CFSTI Prices: HC$3.00 MF$0.75
Oceanics, Inc., Plainview, N. Y.
A PERFORATED MOBILE BREAKWATER FOR FIXED AND FLOATING APPLICATION.
Summary rept. Dec 65-Jul 66.
by Wilbur Marks. Jul 66. 74p TR-66-29
Contract N00014-66-C0090
Proj. NR-062-381

Descriptors: (*Breakwaters, Mobile), (*Hydrodynamics, Breakwaters), Porous materials, Hydraulic models, Ocean waves, Damping, Amphibious operations, Civil engineering, Feasibility studies.

A mobile breakwater concept based upon a perforated front wall and solid back wall is presented. The principles of energy dissipation by the system is discussed as well as the potential role of such a device within the framework of practical application. Model test results, comparing the perforated breakwater's response to waves with that of a caisson-type breakwater, are discussed. It is shown that the perforated breakwater experiences less force on the structure when it is fixed to the bottom and less force on the mooring lines when afloat than the caisson-type. However, the perforated breakwater is not more effective in reducing waves, for the conditions tested. Visual observations show that scouring is prevalent when the caisson-type is fixed to the bottom; there is no evidence of scouring with the perforated breakwater. Recommendations are made for future work. (Author)

AD-636 830 Field 13B, 9B
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
PROGRAMMING A DIGITAL SIMULATION MODEL OF A FREEWAY DIAMOND INTERCHANGE.
Professional paper.
by E. Hayes. 23 Jun 66. 39p SP-2228/000/01
Prepared for presentation at the National Conference Annual Meeting of the Association for Computing Machinery (21st), 30 Aug-1 Sep 66, Los Angeles, Calif.

Descriptors: (*Programming *(Computers), *Civil engineering), (*Roads, Mathematical models), Traffic, Vehicles, Simulation, Digital computers.

Identifiers: Traffic engineering.

The Vehicular Traffic Study Project at System Development Corporation has developed a digital computer simulation model of a portion of a freeway diamond interchange. The total model will be used to conduct research promoting the improvement of the geometric designs of freeway interchanges and to develop effective control devices regulating traffic flow through them. Included is an outline of the four phases of the study being conducted, and a description of the first phase, or Model 1, which has been formulated and coded for a digital computer. The programming components of Model 1 are given, together with the various outputs produced by the data reduction routines. The paper concludes with an indication of the future directions to be taken in this study. (Author)

AD-636 960 Field 13B, 12B
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
OPERATIONS RESEARCH ON URBAN PROBLEMS.
by Frederick T. Moore. Jun 66. 10p P-3414
Prepared for presentation at a symposium of the Washington Operations Research Council, Shoreham Hotel, June, 1966.

Descriptors: (*Operations research, *Urban planning), Urban areas, Social sciences.

For abstract, see T 66 18.

N66-17706 Field 13B, 13H, 9A
CFSTI Price: MF$1.25
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
SYMPOSIUM ON TECHNOLOGY STATUS AND TRENDS.
1966. 239p NASA-SP-5030
Presented at Symp. held at Huntsville, Ala., Apr. 21-23, 1965. Available from Superintendent of Documents, GPO, Washington, D. C. 20402, HC$1.50.

Descriptors: *Conference, *Industry, *Aerospace technology.

PB-169 936 Field 13B
CFSTI Prices: HC$4.00 MF$1.00
Pennsylvania Dept. of Highways, Pittsburgh.
PITTSBURGH AREA TRANSPORTATION STUDY. VOLUME I. STUDY FINDINGS.
Final rept.
Nov 61. 133p
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Transportation, Pennsylvania), (*Roads, Pennsylvania), (*Pennsylvania, Transportation), Urban planning, Population, Geography, Vehicles, Maps.

Contents: Study design (The study area, The inventories, The transportation planning process); Travel characteristics (The travel surveys, The accuracy checks, The quantity of travel, The regularity of travel, The location of travel); Land use (The geographic setting, The land use survey, Patterns of generalized land uses, Patterns of the metropolis, Floor space in the golden triangle);

Trip generation (Trips at households, Choice of mode, Trips at sites of urban activity); Travel facilities (Supply and use of streets, Supply and use of transit routes).

PB-169 946 **Field 13B, 13F**
CFSTI Prices: HC$6.00 MF$1.25
National Capital Transportation Agency, Washington, D. C.
ENGINEERING PLANS AND COST ESTIMATES: ENGINEERING SUPPLEMENT, TRANSIT DEVELOPMENT PROGRAM 1965.
Jan 65, 208p

Descriptors: (*Transportation, District of Columbia), (*Railroads, District of Columbia), (*District of Columbia, Transportation), Urban planning, Railroad tracks, Underground, Design, Costs, Vehicles, Maps, Operation.

The volume consists of three parts: a description of the proposed 25-mile rail rapid transit system for the Washington, D. C. area; estimates of cost; and plans and profiles, which depict the system in detail, and on which the cost estimates are based.

PB-169 957 **Field 13B, 2D**
CFSTI Prices: HC$4.00 MF$0.75
Ohio State Univ., Columbus. Engineering Experiment Station.
A STUDY OF ROADSIDE MAINTENANCE AND ITS EFFECT ON HIGHWAY DESIGN AND CONSTRUCTION.
Final rept.
by Bonner S. Coffman, and William F. Edwards.
Jan 66, 107p Rept. nos. 189-5, 0438

Descriptors: (*Roads, Maintenance), (*Plants (Botany), Roads), Erosion, Grasses, Fertilizers, Costs, Antimetabolites, Soils, Purification, Trees, Ecology, Design, Construction.

Plots were established on median and cut and fill slope areas to determine the relationships between incidence of erosion, turf density and nitrogen, phosphorous and potassium nutrients applied in varying amounts. Moderate quantities of nitroene and phosphorous were necessary to prevent the development of bare areas on slopes. Well organized cost/time studies and extensive observations showed that a reduced-controlled mowing program combined with appropriate equipment can result in mowing cost savings of 25 to 30 percent. On rights-of-way averaging 27 acres of roadside area per mile, this represents an important segment of the maintenance budget. The effectiveness of retardants (growth inhibitors) is closely related to time of application. Use of vegetation control chemicals must be carefully undertaken, and proper equipment is essential particularly in areas adjacent to ornamental plants and susceptible farm crops. Karmex and Simazine are effective soil sterilants. When used singly, the amounts needed for vegetation control beneath guardrails are large and costs are high. Karmex plus WK surfactant and Simazine with Amitrol-T are effective and reasonably safe combinations. To successfully establish plantings of woody species, it is essential that a properly prepared planting bed be provided, and that the following factors be considered: (1) proper selection of species (ecological propriety), (2) good planting techniques, and (3) maintenance during establishment period. (Author)

AD-636 296 **See Field 13A**

AD-636 417 **See Field 13M**

AD-636 622 **See Field 20J**

PB-169 959 **See Field 5A**

PB-170 961 **See Field 5H**

13C. CONSTRUCTION EQUIPMENT, MATERIALS, AND SUPPLIES

PB-170 813 **See Field 11C**

PB-170 948 **See Field 5C**

PB-170 955 **See Field 5C**

13D. CONTAINERS AND PACKAGING

AD-636 963 **Field 13D, 13G, 14B, 11F K**
CFSTI Prices: HC$2.00 MF$0.50
Auburn Research Foundation, Ala.
MECHANISMS OF METALLIC FAILURE: FLAW INITIATION TECHNIQUES AND MEASUREMENTS IN THIN-WALL PRESSURE VESSELS.
by Hal W. Maynor Jr. and Courtney C. Busch.
29 Jun 66, 27p Rept. no. 5
Contract DA-01-021-AMC-12521 (Z)
An instrumented hydraulic system for the introduction of cracks to and burst testing of high-strength steel pressure vessels.

Descriptors: (*Pressure vessels, *Fracture (Mechanics)), (*Hydraulic systems, Test equipment), Rupture, Maraging steels, Nickel alloys, Failure (Mechanics), Model tests, Toughness, Steel, Stresses.

A hydraulic system was designed and constructed for the purpose of introducing surface or part-through-the-thickness cracks to thin-wall (0.065-in.) scale-model pressure vessels. The hoop stresses resulting from internal pressure, in the range 4000 to 5000 psi, will be applied as pressure pulses at frequencies up to 160 cycles per minute for numbers of cycles required to grow cracks of predetermined lengths. The system consists essentially of a motor-driven hydraulic pump, valves, fittings, tubing and appropriate instrumentation. A component of the system, a manually-operated hydraulic pump, will afford burst pressures up to 30,000 psi to test vessels containing induced cracks. Several vessels were fabricated from 18 per cent nickel (250 grade) maraging steel. (Author)

AD-637 113 **Field 13D, 11L**
CFSTI Prices: HC$2.00 MF$0.50
Army Natick Labs., Mass. Container Div.
EVALUATION OF WAX IMPREGNATED CORRUGATED FIBERBOARD CONTAINERS.
Technical rept.
by Anderson Miller, Jul 66, 49p
Proj. DA-1M643324D587
Task 1M643324D58701
USA-NLABS-TR-67-4-CD

Descriptors: (*Containers, Fiberboard), (*Fiberboard, Packing materials), Impregnation, Waxes, Shock resistance, Environment tests, Military requirements, Performance (Engineering), Armed forces supplies.

A study was made to evaluate the performance of wax/resin impregnated fiberboards and containers for applicability for use in shipment overseas under all environmental conditions, and as a substitute for conventional weather resistant materials which may become critical and are in short supply during periods of emergency. Sixteen different tests were performed conforming to ASTM Standards or to the requirements of Federal Specifications, utilizing up to 5 different environmental conditions: standard, arctic, hot desert, rain and tropical. It was found that wax impregnation contributes significantly to increased compression strength through increased resistance to water absorption, and containers of wax impregnated board were superior to other grades of fiberboard in compression resistance. Differences in rough handling were negligible. This was related to the findings that wax impregnation had little effect on dry puncture resistance and on the Mullen bursting strength. Test results indicate that 275 pound test is the minimum grade which should be considered for the wax impregnation process for Military use in overseas shipment.

AD-637 013 **See Field 20K**

PB-170 951 **See Field 5C**

13E. COUPLINGS, FITTINGS, FASTENERS, AND JOINTS

AD-636 385 **See Field 13H**

13F. GROUND TRANSPORTATION EQUIPMENT

AD-467 896 **Field 13F**
CFSTI Prices: HC$9.60 MF$0.75
United States Rubber Tire Co., Detroit, Mich.
DEVELOPMENT OF TIRES FOR THE FAMILY OF MEDIUM TACTICAL TRUCKS.
Final rept., phase 1, 2.
by R. A. Reichert, and E. D. Rogers. Feb 65, 40p
Contract DA-20-018-AMC-0585T
Availability: Microfiche only after original copies are exhausted.

Descriptors: (*Cargo vehicles, Tires), (*Tires, Military requirements), Feasibility studies, Design, Manufacturing methods, Tests, Life expectancy, Structural parts, Fracture (Mechanics), Measurement, Deflection, Rupture, Rubber, Synthetic rubber, Pressure.

Work was directed toward increasing resistance to breaker separation, liner splitting and circumferential splice opening and increasing durability and improving general off-the-road performance of the tires. Excellent test results were obtained with 16-20 low profile tire on all types of indoor tests. Due to the performance level of these tires on indoor testing, this tire is more than adequate for field endurance tests. The experimental test results of the replaceable tread tire were very favorable and it is believed that this concept should be broadened to include the highway-type tire. (Author)

AD-636 445 **Field 13F**
CFSTI Prices: HC$3.00 MF$0.75
Gichner Mobile Systems, Inc., Beltsville, Md.
STRESS ANALYSIS, STUDY OF THE M4 VAN EXPANSIBLE AND ADAPTER, DETACHABLE RUNNING GEAR.
Final techanical letter rept.
1966, 63p
Contract DA-44-009-AMC-1210(K)

Descriptors: (*Cargo vehicles, *Towed vehicles), Expandable structures, Positioning devices (Machinery), Vechicle chassis components, Adapters, Mobility.

Identifiers: M-4 vans.

This is a final report on the modification of the M4 van expansible, the analyses that indicated necessary modifications to the van, design of adapter detachable running gear, and the test report on measured deflections of the van floor and roadability test. Discussion of results and recommendations. (Author)

AD-636 586 **See Field 12B**

PB-169 946 **See Field 13B**

PB-170 948 **See Field 5C**

PB-170 955 **See Field 5C**

PB-170 961 **See Field 5H**

13G. HYDRAULIC AND PNEUMATIC EQUIPMENT

AD-636 842 **Field 13G, 20D, 9B**
CFSTI Prices: HC$4.00 MF$0.75
Corning Glass Works, Bradford, Pa. Electronics Div.
FLUERICS. 21. OPTICAL FABRICATION OF FLUID AMPLIFIERS AND CIRCUITS.
by R. W. Van Tilburg, R. H. Bellman, and W. L. Cochran. May 66, 109p
Contract DA-49-186-ORD-1076
Projs. DA-1P010501A001, HDL-31100
See also AD-635 195.

Descriptors: (*Fluid amplifiers, Performance (Engineering)), Computer logic, Gain, Fluid flow, Manufacturing methods, Jet mixing flow, Power.

Identifiers: Fluerics.

Summarized in this report are the design and fabrication techniques together with an evaluation of proportional fluid amplifiers, gain blocks, and circuits. Also presented are data obtained during staging studies that resulted in the development of a five-stage, high-gain amplifier with output stability and noise level adequate for experiments with feedback. The application of this gain block design is described in developing a scale changer and integrator. Based on this study, the design and fabrication techniques described are considered feasible in developing functional, analog flueric computational circuits. The multistage gain block, using the basic HDL pressure gain design (or a relatively minor modification thereof) is also considered capable of pressure gains greater than 10,000. (Author)

AD-637 121 **Field 13G**
CFSTI Prices: HC$4.00 MF$0.75
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
RESEARCH ON THE USE OF BLUNT TRAILING EDGE BLADES IN SUPERSONIC COMPRESSOR STAGES.
by J. Chauvin, and F. Breugelmans. May 66, 105p
Scientific-1
Grant AF-EOAR-65-65
ARL-66-0154

Descriptors: (*Compressor blades, *Trailing edge), Compressors, Blunt bodies, Supersonic flow, Compressor stators, Belgium.

The report covers paper design for stator configurations to match the R-32 rotor tested under a previous grant, cascade tests of blade sections corresponding to those designs, and paper designs for a modified rotor version (R-32/11), and the associated stator. Tentative performance predictions are presented for both the initial and modified stages. Stator designs for the R-32 rotor have been made using both tandem cascade configurations, incorporating 'slot' effects, and blunt trailing edge blades. Design conditions were to try to turn the flow to axial direction behind the rotor, implying turning of the order of 60 deg to 80 deg, with inlet Mach number to the stator of the order of .9. Two designs using tandem cascade were studied; one using an area reduction across the first row, the second with a constant hub-tip ratio throughout. Danger of choking is predicted for both configurations. (Author)

N66-17355 **Field 13G**
CFSTI Prices: HC$4.00 MF$0.75
Crane Co., Burbank, Calif. Hydro-Aire Div.
DEVELOPMENT PROGRAM OF THE 05-055 HYDRAULIC TRANSFORMER.
Final rept.
by F. E. Forbes. 30 Jun 65, 107p Rept. no. 312-18
Contract NAS8-5264
NASA-CR-70376

Descriptors: *Saturn S- IC Stage, *Hydraulic pump, *Transformer.

For abstract, see T 66 18.

AD-468 372 See Field 20D

AD-636 963 See Field 13D

13H. INDUSTRIAL PROCESSES

AD-636 379 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
International Inst. of Welding.
CATALOGUE OF IIW DOCUMENTS. CATALOGUE DES DOCUMENTS DE L'IIS.
Jan 65, 50p

Descriptors: (*Catalogs, Welding), (*Welding, Documentation), Periodicals, Information retrieval, Scientific organizations.

For abstract, see T 66 18.

AD-636 385 **Field 13H, 13E, 13A**
CFSTI Prices: HC$1.00 MF$0.50
International Inst. of Welding.
COMMISSION XI; PRESSURE VESSELS, BOILERS AND PIPE LINES.
Annual rept.
9 Jul 65, 10p

Descriptors: (*Welding, Symposia), (*Pressure vessels, Welding), (*Boilers, Welding), (*Pipes, Welding), Welds, Stresses, Steel, Heat treatment, Non-destructive testing.

Annual report of Commission XI concerning welding of pressure vessels, boilers, and pipe lines.

AD-636 553 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Cornell Univ., Ithaca, N. Y.
VALUES FOR OPTIMUM REJECT ALLOWANCES.
by J. Delfausse, and S. Saltzman. Jun 66, 11p
Pub. in Naval Research Logistics Quarterly v13 n2, NAVSO-1278, p147-56 Jun 1966.

Descriptors: (*Quality control, *Optimization), Manufacturing methods.

Industrial situations exist where it is necessary to estimate the optimum number of parts to start through a manufacturing process in order to obtain a given number of completed good items. The solution to this problem is not straightforward when the expected number of rejects from the process is a random variable and when there are alternative penalties associated with producing too many or too few items. This paper discusses various aspects of this problem as well as some of the proposed solutions to it. In addition, tables of optimum reject allowances based on a comprehensive model are presented. (Author)

AD-636 588 **Field 13H, 11D, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
DEVELOPMENT OF PRACTICE FOR COMPOSITE ROLLING OF STRUCTURAL METAL PANELS.
Quarterly rept. no. 2, 15 Feb-15 May 66.
by J. R. Van Orsdel, E. S. Bartlett, K. R. Grube, and H. R. Ogden. May 66, 42p
Contract DA-19-066-AMC-308 (X)
Proj. DA-A1-65-11111-01-A1-AW
AMRA-CR-66-02/2
See also AD-632 831.

Descriptors: (*Sandwich panels, Rolling (Metallurgy)), Bonding, Stainless steel, Maraging steels, Nickel alloys, Chromium alloys, Iron alloys, Aluminum alloys, Beryllium, Welding, Heat treatment, Microstructure, Mechanical properties, Composite materials, Contamination, Cleaning.

Identifiers: Stainless steel PH14-8Mo, Inconel (Alloys).

Roll bonding of structural metal panels from Inconel, PH 14-8 Mo alloy, and maraging steel has been hindered by a contaminating film on the faying surfaces. Sources of these films have been shown to be (1) improper cleaning methods and (2) outgassing of pack filler metals. Proper pickling procedures and the use of preoutgassed ingot iron as the filler metal promises to solve the problem. Fabrication of satisfactory aluminum-beryllium composite structures by the roll bonding process appears impractical due to differences in deformation. (Author)

AD-636 594 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON THE WORK IN THE FIELD OF POWDER METALLURGY OF THE RESEARCH INSTITUTE FOR SPECIAL METAL MATERIALS OF THE DAW FOR BERLIN IN DRESDEN.
by F. Eisenkolb. 25 May 66, 19p FTD-TT-65-1764
TT-66-61911
Unedited rough draft trans. of Neue Huette (East Germany) v8 n10 p629-33 1963.

Descriptors: (*Powder metallurgy, East Germany), Powder alloys, Fiber metallurgy, Cermets, Sintering, Scientific research.

For abstract, see T 66 18.

AD-636 624 **Field 13H, 11F, 11B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SYMPOSIUM ON PURE MATERIALS IN SCIENCE AND TECHNOLOGY.
by J. Kubala, W. Baronius, and W. Geidel. 4 Apr 66, 21p FTD-TT-65-837
TT-66-61935
Edited trans. of Symposium Reinststoffe in Wissenschaft und Technik, 30 Nov-2 Dec 61 in Dresden, Papers, Berlin, 1963 p179-81, 183-91.

Descriptors: (*Materials, Symposia), (*Purification, Materials), Beryllium compounds, Oxides, Titanium, Niobium, Tantalum, East Germany, Solvent extraction.

Contents: Preparation of Highly Pure Beryllium Oxide, by J. Kubala; Separation of Titanium, Niobium, and Tantalum Through Liquid-Liquid-Extraction, by W. Baronius and W. Geidel.

AD-636 676 **Field 13H, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
NITRIDING OF TITANIUM ALLOYS AT REDUCED PRESSURES.
by E. V. Novikova. 23 May 66, 14p FTD-TT-65-1630
TT-66-61960
Unedited rough draft trans. of Akademiya Nauk SSSR. Institut Metallurgii, Moscow. Trudy p132-8 1964.

Descriptors: (*Case hardening, *Titanium alloys), Pressure, USSR, Thickness, Nitrogen, Wear resistance, Controlled atmospheres.

A reduction in pressure in chamber at the nitriding of titanium alloys from 760 to 1 - 0.1 mm Hg leads to an increase in depth of the nitrided layer by 1.5 to 2.0 times. The thickness of the brittle nitrided zone decreases by several times. It was established that for each titanium alloy, at same temperature and nitriding duration conditions, there should exist definite pressures and nitrogen consumption at which it is possible to obtain a maximum depth of the layer. The layer obtained in rarefied nitrogen has good wear resistance and is not inferior to the layer obtained by nitriding in normal pressure. Mechanical characteristics of sample core of VT4 alloy, after nitriding in rarefied nitrogen, differs little from the nature obtained on sam-

ples nitrided at normal pressures (strength limit and impact ductility increase somewhat; relative elongation and narrowing remain practically the same). (Author)

AD-636 767 **Field 13H, 1C**
CFSTI Prices: HC$2.00 MF$0.50
Aeroprojects, Inc., West Chester, Pa.
ULTRASONIC RING WELDING OF HERMETIC COVERS OVER FASTENER HEADS ON AIRCRAFT SURFACES.
Final research rept.
by Forrest S. Williams. Jun 66, 40p RR-66-58
Contract N165-47064

Descriptors: (*Mechanical fasteners, *Protective treatments), (*Ultrasonic welding, Hermetic seals), Corrosion inhibition, Airplane panels, Feasibility studies, Aluminum, Bolts, Steel, Surfaces.

The feasibility of installing covers over aircraft fasteners by ultrasonic ring welding, in order to protect the aluminum skin/steel bolt interface from corrosive atmosphere, was demonstrated. Existing ultrasonic equipment was adapted along lines of expediency for use on an aircraft surface, and a spot-facing tool was aligned with the welder to provide the flat surface required for ultrasonic welding. About 25 covers of 0.005-inch aluminum 1145-H19 were sealed over main structural fasteners on a wing panel. All seals were leaktight to helium at a sensitivity of 1 x 10 to the minus 9th power cc/sec. Test panels were prepared to simulate the processing used on the wing and forwarded to the Navy for fatigue-corrosion testing. Design criteria were established and conceptual layouts prepared for prototype equipment for ultrasonically welding covers over an entire aircraft at Navy overhaul stations. (Author)

AD-637 021 **Field 13H, 11B**
CFSTI Prices: HC$1.00 MF$0.50
Linden Labs., Inc., State College, Pa.
MACHINING HIGH PURITY ALUMINA.
Quarterly repts. nos. 6 and 7, 30 Sep 65-31 Mar 66.
30 Apr 66, 10p
Contract DA-36-039-AMC-03634 (E)
See also AD-632 890.

Descriptors: (*Refractory materials, Machining), (*Machining, Ceramic materials), (*Aluminum compounds, Oxides), Fluorination, Purification, Sintering.

The observations during the machining of the preproduction samples are presented and discussed. 96% alumina samples were fluorinated and machined to form a variety of complex shapes.

AD-637 055 **Field 13H**
CFSTI Prices: HC$5.00 MF$1.00
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EXPLOSIVE FORMING OF SHEET METAL.
by R. V. Pikhtovnikov, and V. I. Zavyalova. 4 Apr 66, 186p FTD-MT-65-50
TT-66-62032
Edited machine trans. of mono. Shtampovka Listovogo Metalla Vzrivom, Moscow 1964, 175p.

Descriptors: (*Explosive forming, Sheets), USSR, Metals, Deformation, Machine tools, Loading (Mechanics), Stresses, Safety.

Contents: history of the rise of explosive forming of sheet metal, schemes of stamping processes, physical essence of explosion and external loads, deformation of metals by explosion, energy of deformation, magnitude of charge, equipment applied during stamping of sheet parts with help of energy of explosion, technology and equipment for explosive forming processes, industrial safety during explosive forming operations, planning shops for explosive forming, technical and economic indices.

AD-637 067 **Field 13H, 9A, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A METHOD OF REMOVING THE SURFACE FILM FORMED AFTER THE DIFFUSION OF BORON ON THE SURFACE OF SILICON.
by Cheng-sung Huang. 9 May 66, 7p FTD-TT-65-1435
TT-66-62040
Edited trans. of Wu Li Hsueh Pao (Chinese People's Republic) v20 n3 p285-6 1964.

Descriptors: (*Semiconductors, *Electrolytic polishing), (*Silicon, Electrolytic polishing), Doping, Boron, Diffusion, Films, Electrolysis, Material removal, China.

In using B2O3 as an impurity source to form a P-N bond by diffusion on the surface of a N-type silicon sheet, a thin layer of a blue or dark gray film will be formed if the temperature of diffusion is too high and the time is too long. A simple electrolytic method of removing that surface film is proposed. It destroys the film formed on the surface of silicon after diffusion without corroding the silicon itself.

N66-10541 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
THE EFFECT OF NEUTRON IRRADIATION AND HYDROGEN CONCENTRATION ON TENSILE PROPERTIES OF THE CANDU COOLANT TUBE SPACER ALLOY.
by C. E. Ells, and A. Sawatzky. Jun 65, 31p
AECL-2272

Descriptors: *Neutron flux, *Tensile strength, *Zirconium-niobium alloy, *Hydrogen.

For abstract, see T 66 18.

N66-10706 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
Hawker Siddeley Canada, Ltd., Toronto (Ontario). Engineering Div.
THE EVALUATION AND PROPERTIES OF COATINGS FOR SUPER ALLOYS AND REFRACTORY METALS.
Working paper no. M35, Issue no. 2.
by W. A. James. Jan 65, 51p

Descriptors: *Coating, *Superalloy, *Refractory metal.

N66-10941 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
DAMAGE AND DIFFUSION IN AL AND AL- AL2 03 ALLOY FOLLOWING BOMBARDMENTS WITH OXYGEN OR INERT GAS.
by R. Kelly, and E. Ruedl. Aug 65, 31p
EUR-2478.E
Prepared for presentation at Intern. Powder Met. Conf., New York, 14-17 Jun 1965.

Descriptors: *Aluminum alloy, *Proton damage, *Rare gas, *Aluminum, *Bombardment, *Diffusion.

N66-11754 **Field 13H**
CFSTI Prices: HC$3.00 MF$0.50
National Research Corp., Cambridge, Mass.
ADHESION AND COHESION OF METALS.
Final technical rept. 24 Mar. 64 - 1 Jan. 65.
by L. R. Allen, F. J. Brock, J. L. Ham, and P. L. Vitkus. 1 Apr 65, 51p
Contract NASw-734
NASA-CR-67946

Descriptors: *Adhesion, *Cohesion, *Space exploration.

N66-11764 **Field 13H**
CFSTI Prices: HC$3.00 MF$0.75
IIT Research Inst., Chicago, Ill. Technology Center.
NONDESTRUCTIVE TESTING TECHNIQUES FOR MULTILAYER PRINTED WIRING BOARDS.
Final rept. 30 Jun 64-30 Sep 65.
by H. G. Hamre, R. B. Moler, and R. A. Zalewski. 30 Sep 65, 98p IITRI-E6024-15
Contract NAS8-11288
NASA-CR-67988

Descriptors: *Laminated material, *Nondestructive testing, *Printed circuit.

N66-13033 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Weapons Research Establishment, Aldermaston (England).
THE FATIGUE OF URANIUM.
by P. D. Tilbury. Aug 65, 19p AWRE-O-65/65

Descriptors: *Fatigue test, *Uranium, *Mechanism.

N66-13148 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Culham Lab., United Kingdom Atomic Energy Authority, Abingdon (England).
THE PREPARATION AND PROPERTIES OF SINTERED NB3 SN.
by R. Hancox, and C. H. Walker. May 65, 14p
CLM-R-43

Descriptors: *Intermetallics, *Niobium compound, *Sintering, *Electric property, *Tin compound.

N66-13190 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Ghent Univ. (Belgium).
THE WELDING OF VERY THICK STEELS. MARGIN OF UNCERTAINTY OF THE ROBERTSON TEST.
20 May 65, 15p Rept. no. 7
Contract EURATOM-042-61-9-RDB
EURAEC-1406 EUR-2365

Descriptors: *Brittleness, *Steel, *Impact load, *Material testing, *Welding.

N66-14251 **Field 13H**
CFSTI Prices: HC$6.00 MF$1.25
General Dynamics/Convair, San Diego, Calif.
ONSET OF CREEP STRESS MEASUREMENTS IN METALLIC MATERIALS. CREEP TEST MACHINE CONSTRUCTION AND OPERATION.
by C. W. Alesch. Mar 65, 221p GDC-64-213
Contract NASw-491
NASA-CR-68966

Descriptors: *Creep testing machine, *Metal, *Threshold, *Deformation, *Measuring apparatus.

N66-16067 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Progressive Welder and Machine Co., Pontiac, Mich. Special Machine Div.
STUDIES OF 'SOFT TOOLING' FOR A SEMITOROIDAL TEST TANK.
Final rept.
by C. H. Baum. 15 Oct 65, 7p
Contract NAS8-11787
NASA-CR-69693

Descriptors: *Test equipment, *Tooling, *Toroidal shell.

N66-16262 **Field 13H, 9B**
CFSTI Prices: HC$3.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
COMPUTER ANALYSES OF TENSILE TESTS.
by D. J. Boerman, P. Bonnet, M. Grin, and A. Hubaux. Sep 65, 58p EUR-2514.E

Descriptors: *Aluminum alloy, *Computer program, *Sintered aluminum powder, *Tensile stress.

N66-16369 Field 13H
CFSTI Prices: HC$4.00 MF$0.75
Boeing Co., Seattle, Wash. Materials and Processes.
RESEARCH STUDY FOR DEVELOPMENT OF TECHNIQUES FOR JOINING OF DISSIMILAR METALS.
by W. A. Baginski, C. H. Crane, and D. T. Lovell. 1964, 117p
Contract NAS8-11307
NASA-CR-69242

Descriptors: *Aluminum alloy, *Metal-metal bonding, *Production engineering, *Diffusion bonding, *Metal joint.

N66-16947 Field 13H
CFSTI Prices: HC$2.00 MF$0.50
Commonwealth Scientific and Industrial Research Organization, Sydney (Australia). National Standards Lab.
TOOL-LIFE EXPONENTS IN THE LIGHT OF REGRESSION ANALYSIS.
by R. T. Leslie, and G. Lorenz. 1964, 34p
Technical paper no. 20
Prepared for presentation at Gen. Assembly of the Intern. Inst. of Production Eng. Res. (C.I.R.P.) 12th, The Hague, 1962.

Descriptors: *Production engineering, *Machine tool, *Regression analysis.

N66-17164 Field 13H
CFSTI Prices: HC$3.00 MF$0.75
College of Aeronautics, Cranfield (England). Dept. of Production and Industrial Administration.
ELECTRO-CHEMICAL MACHINING.
by D. A. Glew, and C. F. Noble. Feb 65, 67p
COA-NOTE-M and P-7

Descriptors: *Electrochemical machining, *High strength alloy, *Steel, *Aluminum.

N66-17277 Field 13H
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
BIBLIOGRAPHY ON WELDING METHODS, WITH INDEXES.
Feb 66, 58p NASA-SP-5024

Descriptors: *Abstract, *Bibliography, *Welding.

N66-18408 Field 13H
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Denver, Colo. Ordnance Applications Lab.
DEVELOPMENT OF EXPLOSIVE FORMING TECHNIQUES FOR SATURN V COMPONENTS.
Final rept. 24 Jun 64-28 Jan 66.
by K. R. Agricola, and I. K. Sheffield. Jan 66, 72p
Contract NAS8-11616
NASA-CR-70588, NASA-CR-66-6

Descriptors: *Aluminum alloy, *Saturn V launch vehicle, *Titanium, *Explosive forming, *Steel.

AD-466 007 See Field 11F

AD-636 410 See Field 9A

AD-636 420 See Field 9A

AD-636 422 See Field 13J

AD-636 449 See Field 9A

AD-636 575 See Field 9A

AD-636 576 See Field 9A

AD-636 654 See Field 9E

AD-636 663 See Field 11H

AD-636 683 See Field 11F

AD-636 775 See Field 9A

AD-636 778 See Field 9A

AD-636 798 See Field 9A

AD-636 801 See Field 9A

AD-636 802 See Field 9A

AD-636 921 See Field 9A

AD-636 922 See Field 12A

AD-636 985 See Field 9A

AD-637 020 See Field 9A

AD-637 044 See Field 11F

AD-637 108 See Field 9A

AD-637 114 See Field 9A

N66-17706 See Field 13B

PB-170 813 See Field 11C

PB-170 947 See Field 5C

PB-170 949 See Field 5C

PB-170 954 See Field 5C

13I. MACHINERY AND TOOLS

AD-636 318 Field 13I, 20K
CFSTI Prices: HC$1.00 MF$0.50
Westinghouse Research Labs., Pittsburgh, Pa.
UNBALANCE VIBRATION AND FORCE RATIOS OF ROTOR-BEARING SYSTEMS.
Research rept.
by A. C. Hagg. 15 May 63, 24p RR-63-917-515-R1
Contract NObs-86809
Proj. SF-013-11-01
Task 1352

Descriptors: (*Bearings, Vibration), (*Force (Mechanics), Bearings), Machines, Noise, Rotation, Damping.

An important component of machinery noise is that caused by unbalance force of the rotating element. In addition to direct control at the source by precision balancing, it is important to provide for minimum response and force transmission of the rotor-bearing system. The results of an analysis of a representative system are given in nondimensional graphs for design estimates. These show that the response and force transmission mainly depend on the proximity of the operating speeds to critical speeds of the system. At or near the critical speeds the damping in the bearings have primary effect. Within the complex of practical design and operating requirements, significant magnification of unbalance force at the bearings probably can be avoided. In special cases some reduction in force transmission may be possible. (Author)

AD-636 941 Field 13I, 14B
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Instrumentation Lab.
STUDIES OF BASIC BEARING DESIGNS FOR AN ADVANCED GYRO TEST TURNTABLE.
Technical rept.
by Joseph G. Guilmette, and Ira C. Weymouth.
Mar 66, 66p E-1932
Contract AF 29 (600)-5478
MDC-TR-66-65

Descriptors: (*Gas bearings, Test equipment), (*Journal bearings, Test equipment), (*Test equipment, Bearings), Gyroscopes, Thrust bearings, Air, Fluid flow, Oils, Loading (Mechanics), Films, Design.

This report presents a simplified approach to the design of externally pressurized, orifice-restricted fluid bearings, with special emphasis on a configuration suitable for the turntable design of Bausch and Lomb Incorporated. Basic flow relationships that enable the solution by digital computer of flow, film thickness, and stiffness of bearings under all practical operating conditions are studied. Three types of bearings are considered: a pair of opposing-thrust air bearings, an eight-pad oil journal bearing, and an eight-pad air journal bearing. In addition to solving for flow, film thickness and stiffness, a detailed analysis of the load capabilities of the oil journal bearing is carried out, as well as an optimization of the bearing design. The solution of a typical design problem using the methods developed is discussed, together with the new techniques required for a thorough bearing analysis. (Author)

PB-170 947 See Field 5C

PB-170 949 See Field 5C

PB-170 950 See Field 5C

PB-170 951 See Field 5C

PB-170 954 See Field 5C

PB-170 956 See Field 5C

13J. MARINE ENGINEERING

AD-636 288 Field 13J
CFSTI Prices: HC$1.60 MF$0.50
Ship Structure Committee, Washington, D. C.
PRESENT DAY PROBLEMS IN THE CONSTRUCTION OF WELDED STEEL VESSELS.
by Per Stenberg. Jul 50, 20p
Prepared in cooperation with National Academy of Sciences-National Research Council, Washington, D. C. Div. of Engineering and Industrial Research.

Descriptors: (*Ship hulls, Welds), Ships, Steel, Ship plates, Ship structural components, Welding, Construction, Merchant vessels, Fracture (Mechanics).

For abstract, see T 66 18.

AD-636 289 Field 13J, 11F
CFSTI Prices: HC$6.60 MF$0.75
Ship Structure Committee, Washington, D. C.
VISIT TO ENGLAND AND SCOTLAND.
by Finn Jonassen. Apr 50, 65p
Prepared in cooperation with National Academy of Sciences-National Research Council, Washington, D. C. Div. of Engineering and Industrial Research.

Descriptors: (*Ship structural components, Design), Great Britain, Steel, Ship plates, Ship hulls, Welds, Marine engineering, Riveted joints, Structural properties, Shipyards, Stresses, Corrosion, Propellers (Marine).

Contents: Steel; Structural Testing; Reduction and Analysis of Tests on S. S. Vulcan; Shipyards, John Brown - Clydebank, Harland-Wolff - Govan, Vickers-Armstrongs, Walker - Newcastle upon Tyne, Swan Hunter and Wigham Richardson - Wallsend, Burntisland Shipbuilding Co. - Burntisland; Residual Stresses; Miscellaneous, (1) Corro-

sion, (2) Propeller Testing, (3) Other Studies at King's College, (4) Failures in Swedish Ships, (5) The Indexing and Analyses of Survey Reports, (6) Schnadt Test.

AD-636 290 **Field 13J, 11F**
CFSTI Prices: HC$2.60 MF$0.50
National Bureau of Standards, Washington, D. C.
INVESTIGATION OF FRACTURED STEEL PLATES REMOVED FROM WELDED SHIPS.
Progress rept. for 30 Dec 48.
by Morgan L. Williams, Melvin R. Meyerson, Gordon L. Kluge, and Leo R. Dale. 22 Sep 49, 25p NBS-2
See also AD-636 304.

Descriptors: (*Ship plates, Fracture (Mechanics)), (*Ship hulls, Welds), Steel, Structural properties, Ship structural components, Notch sensitivity, Transition temperature, Failure (Mechanics), Tensile properties.

The relations previously reported between the nature of the fractures in the plates and their notched bar properties are confirmed by the tests of the additional plates. With increases of 10 percent to 45 percent in the number of plates tested in the various groups, there were no significant changes in the average values of the notched bar properties, and with few exceptions the new data fell within the previously reported ranges of values. In general the transition temperatures of the plates involved in the more recent casualties were lower than the averages for plates tested previously. This may be an indication of a significant trend toward lower transition temperatures of the plates involved in failures, but the evidence is not sufficient to warrant a definite conclusion. Tensile tests using different types or sizes of test specimens were made on several of the plates. In nearly all of these duplicate tests slightly higher values of the tensile strength, and considerably higher percentages of elongation were obtained with the smaller specimens. The manganese/carbon ratios of 6 of the plates were higher than was found for any of the plates tested previously. There was no correlation between these higher manganese/carbon ratios and the transition temperatures of the plates or the nature of the fractures which occurred in service.

AD-636 291 **Field 13J, 5A**
CFSTI Prices: HC$6.60 MF$0.75
Ship Structure Committee, Washington, D. C.
ANNUAL REPORT FROM THE SHIP STRUCTURE SUBCOMMITTEE TO THE SHIP STRUCTURE COMMITTEE.
1 May 59, 69p
See also AD-636 292.

Descriptors: (*Ship structural components, Research program administration), (*Ship hulls, Marine engineering), Ship plates, Fracture (Mechanics), Brittleness, Steel, Defects (Materials), Quality control, Loading (Mechanics), Welds, Notch toughness, Ships, Motion, Stresses, Design, Rolling (Metallurgy).

This Annual Report from the Ship Structure Subcommittee to the Ship Structure Committee covers the activities of the Subcommittee and the research groups during the year since 1 May 1958. This report includes a technical summary of the research work during the year and an administrative summary of the personnel, finances, and operation of the program. The several appendices describe the status of all projects and groups under the Ship Structure Committee program. (Author)

AD-636 292 **Field 13J, 5A**
CFSTI Prices: HC$7.60 MF$0.75
Ship Structure Committee, Washington, D. C.
ANNUAL REPORT OF THE SHIP STRUCTURE COMMITTEE MAY 1, 1960.
1 May 60, 76p
See also AD-636 293.

Descriptors: (*Ship structural components, Research program administration), (*Ship hulls, Marine engineering), Ship plates, Fracture (Mechanics), Brittleness, Steel, Stresses, Design, Rolling (Metallurgy), Fatigue (Mechanics), Defects (Materials), Ships, Loading (Mechanics), Welds, Metallurgy.

This Annual Report of the Ship Structure Committee to the convening authority, the Secretary of the Treasury, covering the activities of the Committee and its affiliated research groups for the year ending 1 May 1960. Technical portions of this report are a continuation of the series of technical progress reports that began with the publication in 1946 of the Final Report of the Ship Structure Committee's predecessor, the Board to Investigate the Design and Methods of Construction of Welded Steel Merchant Vessels. (Author)

AD-636 293 **Field 13J, 5A**
CFSTI Prices: HC$10.60 MF$0.75
Ship Structure Committee, Washington, D. C.
ANNUAL REPORT OF THE SHIP STRUCTURE COMMITTEE MAY 1, 1961.
1 May 61, 106p
See also AD-636 294.

Descriptors: (*Ship structural components, Research program administration), (*Ship hulls, Marine engineering), Ship plates, Fracture (Mechanics), Brittleness, Steel, Stresses, Design, Rolling (Metallurgy), Fatigue (Mechanics), Defects (Materials), Ships, Loading (Mechanics), Metallurgy.

This Annual Report of the Ship Structure Committee to the convening authority, the Secretary of the Treasury, covering the activities of the Committee and its affiliated research groups for the year ending May 1, 1961. Technical portions of this report are a continuation of the series of technical progress reports that began with the publication in 1946 of the Final Report of the Ship Structure Committee's predecessor, the Board to Investigate the Design and Methods of Construction of Welded Steel Merchant Vessels. (Author)

AD-636 294 **Field 13J, 5A**
CFSTI Prices: HC$10.60 MF$0.75
Ship Structure Committee, Washington, D. C.
ANNUAL REPORT OF THE SHIP STRUCTURE COMMITTEE MAY 1, 1962.
1 May 62, 109p
See also AD-636 293.

Descriptors: (*Ship structural components, Research program administration), (*Ship hulls, Marine engineering), Ship plates, Fracture (Mechanics), Brittleness, Steel, Rolling (Metallurgy), Design, Fatigue (Mechanics), Stresses, Metallurgy, Loading (Mechanics), Defects (Materials), Strain (Mechanics).

The report covers the activities of the committee and its affiliated research groups for the year ending May 1, 1962. Technical portions of this report are a continuation of the series of technical progress reports.

AD-636 302 **Field 13J, 5A**
CFSTI Prices: HC$6.60 MF$0.75
Ship Structure Committee, Washington, D. C.
ANNUAL REPORT FROM THE SHIP STRUCTURE SUBCOMMITTEE TO THE SHIP STRUCTURE COMMITTEE MAY 1, 1957.
by J. A. Brown. 1 May 57, 64p
See also AD-636 303.

Descriptors: (*Ship structural components, Research program administration), (*Ship hulls, Marine engineering), Ship plates, Fracture (Mechanics), Brittleness, Steel, Defects (Materials), Quality control, Loading (Mechanics), Welds, Notch toughness, Ships, Motion, Stresses, Design.

This Annual Report of the Ship Structure Subcommittee to the Ship Structure Committee covers the activities of the Subcommittee and the research groups during the year since 1 May 1956. This report includes a technical summary of the research work during the year and an administrative summary of the personnel, finances, and operation of the program. The several appendices describe the status of all projects and groups under the Ship Structure Committee program. Appendix G presents the proposed research program and budgets for 1958 and 1959. (Author)

AD-636 303 **Field 13J, 5A**
CFSTI Prices: HC$6.60 MF$0.75
Ship Structure Committee, Washington, D. C.
ANNUAL REPORT FROM THE SHIP STRUCTURE SUBCOMMITTEE TO THE SHIP STRUCTURE COMMITTEE MAY 1, 1958.
by J. A. Brown. 1 May 58, 64p
See also AD-636 291.

Descriptors: (*Ship hulls, Marine engineering), (*Ship structural components, Research program administration), Ship plates, Fracture (Mechanics), Notch toughness, Brittleness, Steel, Design, Stresses, Defects (Materials), Welds, Quality control, Ships, Motion, Loading (Mechanics).

This Annual Report from the Ship Structure Subcommittee to the Ship Structure Committee covering the activities of the Subcommittee and the research groups during the year since 1 May 1957. This report includes a technical summary of the research work during the year and the administrative summary of the personnel, finances, and operations of the program. The several appendices describe the status of all projects and groups under the Ship Structure Committee program. (Author)

AD-636 304 **Field 13J, 11F**
CFSTI Prices: HC$7.60 MF$0.75
National Bureau of Standards, Washington, D. C.
INVESTIGATION OF FRACTURED STEEL PLATES REMOVED FROM WELDED SHIPS.
Progress summary rept. Jun 42-May 48.
by Morgan L. Williams, and George A. Ellinger. 25 Feb 49, 78p NBS-1
See also AD-636 290.

Descriptors: (*Ship plates, Fracture (Mechanics)), (*Ship hulls, Welds), Steel, Structural properties, Notch sensitivity, Ship structural components, Defects (Materials), Stresses, Failure (Mechanics).

This report covers the examination of fractured plates selected from 60 ships in which structural failures occurred. The chemical compositions and ordinary mechanical properties of most of the plates were satisfactory and met the specification requirements under which they were purchased. However, Charpy notched bar tests indicated that the plates in which fractures originated were notch sensitive at the temperature of fracture, and plates in which the fractures ended were generally less notch sensitive. Most of the fractures occurred at low operating temperatures, and the origin of each of the fractures examined could be traced to a notch such as a hatch corner, ladder opening, or a faulty weld. Such notches and defects create regions of stress concentration which may start failures in steels that are notch sensitive at the operating temperatures. (Author)

AD-636 305 **Field 13J, 11F**
CFSTI Prices: HC$4.60 MF$0.50
National Bureau of Standards, Washington, D. C.
EXAMINATIONS AND TESTS OF FRACTURED STEEL PLATES REMOVED FROM WELDED SHIPS.
Progress rept.
by Morgan L. Williams. 2 Apr 53, 50p NBS-4
Projs. SR-106, NS-011-048
See also AD-636 306.

Descriptors: (*Ship plates, Fracture (Mechanics)), (*Ship hulls, Welds), Steel, Structural properties, Ship structural components,

Notch sensitivity, Transition temperature, Failure (Mechanics).

This report covers the examinations of samples from 8 fractured ships received between April 1, 1950, and March 1, 1951, and laboratory investigations of 13 plates selected from these samples. Preliminary examinations of these samples and preparation of test specimens are in progress, and results of some of these preliminary examinations are discussed briefly in connection with their similarity to previous failures. A different method of analysis of the accumulated data for transition temperatures of source, thru, and end plates, by the use of percentage frequency diagrams, is discussed and illustrated. The method of calculation of the probable maximum transition temperatures of the plates from their chemical compositions and fracture grain sizes is illustrated in a table, and the calculated maximum and the observed transition temperatures of the plates are compared. The method used for determinations of the fracture grain size is described.

AD-636 306 **Field 13J, 11F**
National Bureau of Standards, Washington, D. C.
ANALYSIS OF BRITTLE BEHAVIOR IN SHIP PLATES.
by Morgan L. Williams. 7 Feb 55, 39p NBS-5 Proj. SR-106
See also AD-636 305.

Descriptors: (*Ship plates, Fracture (Mechanics)), (*Ship hulls, Welds), Brittleness, Steel, Structural properties, Failure (Mechanics), Stresses, Tensile properties, Notch sensitivity, Ship structural components.

An analysis of data obtained from investigations of structural failures in nearly 100 ships is presented. The investigations included determinations of the circumstances under which the failures occurred and of the nature, location, and starting points of the fractures, as well as laboratory examinations of the plates involved. Samples taken from fracture areas of each of the ships were examined to determine factors that may have contributed to the failure, and laboratory investigations have been completed on more than 130 plates selected from these samples. In every fracture examined, the starting point could be traced to a point of stress concentration resulting from design details, welding defects, accidental damage, or the metallurgical effects of arc strikes or of fabricating operations such as welding, flame cutting, or cold forming. Frequently a combination of these factors contributed to the origin of the failure. No relation was found between service experience and the tensile properties of the steels, but V-notch Charpy tests showed that plates in which fractures originated were generally more notch sensitive than plates that did not contain the source of a fracture. Analyses of the notched bar test data and of the relations between service experience, notch sensitivity, and chemical compositions of the steels are presented. (Author)

AD-636 307 **Field 13J, 11F**
CFSTI Prices: HC$1.60 MF$0.50
Ship Structure Committee, Washington, D. C.
TECHNICAL PROGRESS REPORT OF THE SHIP STRUCTURE COMMITTEE (1st).
1 Mar 48, 12p
See also AD-636 308.

Descriptors: (*Ship structural components, Design), (*Ship hulls, Welds), Structural properties, Deformation, Steel, Ship plates, Fracture (Mechanics), Brittleness, Welding, Merchant vessels, Marine engineering, Statistical data.

The report is arranged in four parts under the general subjects of Design, Fabrication, Materials, and Statistics. Under the first, Design, is recorded confirmation of theoretical formulas for the bending of the hull girder of a ship and demonstration by laboratory tests of the improvements to be gained by relatively simple changes in design details. The second part, on Materials summarizes the continuation of the basic work on steel hull plate, looking toward an understanding of the fundamental reasons for brittle fracture, and shows the progress being made toward improvements in specifications in an effort to lower the incidence of fractures. Methods of Fabrication, the third part, summarizes the effect of certain fabrication practices on structural performance. In the fourth part cumulative statistical data on ship casualties are brought up to date.

AD-636 308 **Field 13J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Ship Structure Committee, Washington, D. C.
TECHNICAL PROGRESS REPORT OF THE SHIP STRUCTURE COMMITTEE (2nd).
1 Jul 50, 14p
See also AD-636 309.

Descriptors: (*Ship structural components, Design), (*Ship hulls, Welds), Structural properties, Steel, Ship plates, Notch toughness, Fracture (Mechanics), Brittleness, Welding, Stresses, Marine engineering, Statistical data, Merchant vessels, Heat treatment, Transition temperature.

Justification of the various structural modifications employed is indicated by the service record of Liberty ships and T-2 Tankers, based on reduction of frequency of major casualties. Brittle fractures may be initiated in welded ships if the steel used in the main hull girder absorbs less than 15 ft.-lb. of energy in the standard V-notch Charpy impact test at a temperature of 60 F. It is not known, however, how much more notch-tough the steel must be in order to remove the danger of brittle fracture. This statement is based on the investigation of failures during the past eight years and consequently is established only for the types of vessels covered by the investigation and the operating conditions that existed for these same vessels. Based on the conclusion 3 above, some ship plates in 3/4-in. thickness would appear to be undesirable for use in welded ship construction. Either preheating or postheating generally lowers the transition temperature of ship steel weldments. (Author)

AD-636 309 **Field 13J, 11F**
CFSTI Prices: HC$2.60 MF$0.50
Ship Structure Committee, Washington, D. C.
TECHNICAL PROGRESS REPORT OF THE SHIP STRUCTURE COMMITTEE (3rd).
1 Aug 53, 25p
See also AD-636 310.

Descriptors: (*Ship structural components, Design), (*Ship hulls, Welds), Structural properties, Steel, Ship plates, Fracture (Mechanics), Notch toughness, Stresses, Welding, Statistical data, Merchant vessels, Marine engineering.

Knowledge is available as to composition and processing to produce hull steels of greater notch toughness than those presently being provided. Crack arresters, although effective in stopping any given crack, cannot necessarily be depended upon to prevent complete structural failure of the ship. (Author)

AD-636 310 **Field 13J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Ship Structure Committee, Washington, D. C.
TECHNICAL PROGRESS REPORT OF THE SHIP STRUCTURE COMMITTEE (4th).
1 Apr 59, 35p
See also AD-636 309.

Descriptors: (*Ship structural components, Design), (*Ship hulls, Welds), Structural properties, Steel, Ship plates, Fractural (Mechanics), Statistical data, Merchant vessels, Marine engineering, Stresses, Notch toughness, Defects (Materials), Radiography.

To date investigations have not established the relative degree to which residual stress is likely to contribute to the initiation or propagation of fracture in ships. Brittle fracture of mild steel can be obtained when the average tensile stress is smaller than the yield stress, provided there has been some prior compressive cold working of the steel in the direction of the tensile loading. Cleavage-type microcracks are associated with fracture of ship steel at low temperatures. Full-scale heats of semikilled steel can be made in thicknesses to 1 1/2 in. that have about the same notch toughness as ABS Class-B steel in thicknesses to about 1 in. Mill sampling methods have been developed for ABS Class-B and Class-C steel that should be of value to any group that wishes to take samples of these grades of steel. Iridium 192 provides the fastest method and best sensitivity for radiographic inspection of steel welds. A limited comparison of riveted and welded crack arrestors has verified that for equal materials the riveted arrestor is better (because of the discontinuity of the plating), but that flush-welded strips of high notch-tough steel can stop running cracks under certain laboratory conditions. The required width of material and properties of the arrestor strip have not yet been determined. Flaws cannot yet be evaluated for their potential danger to a structure.

AD-636 332 **Field 13J**
CFSTI Prices: HC$16.80 MF$1.00
Ship Structure Committee, Washington, D. C.
THE DESIGN AND METHODS OF CONSTRUCTION OF WELDED STEEL OF MERCHANT VESSELS.
Final rept.
15 Jul 46, 172p
Rept. of an investigation.

Descriptors: (*Merchant vessels, Welds), Construction, Design, Ship hulls, Structural properties, Steel, Welding, Ship plates, Fracture (Mechanics), Failure (Mechanics), Brittleness, Tankers, Cargo ships.

Early in WW II, welded merchant vessels experienced difficulties in the form of fractures which could not be explained. The fractures, in many cases, manifested themselves with explosive suddenness and exhibited a quality of brittleness which was not ordinarily associated with the behavior of a normally ductile material such as ship steel. In April 1943, the Secretary of the Navy established a Board of Investigation. This is the third and final report of the Board intended to cover all phases of the Board's activity during the entire period of its existence. All salient results are discussed, findings listed and conclusions drawn. Part I - Structural Failure History, Part II - Analysis of Factors Contributing to Structural Failures, Part III - Susceptibility to Fracture of Different Ship Designs and Structural Details, Part IV - Effectiveness of Certain Structural Alterations, Part V - Steel Quality. At the end of the report recommendations are made for future work which appears to be necessary or desirable in the solution of unfinished phases of the problem. (Author)

AD-636 359 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Liege Univ. (Belgium).
SOME REFLECTIONS OF A STRUCTURAL ENGINEER REGARDING RESEARCH PROBLEMS IN SHIP STRUCTURAL DESIGN.
Special rept.
by C. E. Massonnet. 13 Aug 62, 23p
Prepared in cooperation with Ship Structure Committee, Washington, D. C.

Descriptors: (*Ship structural components, Design), Ship hulls, Loading (Mechanics), Belgium, Marine engineering, Research program administration, Safety, Stresses, Structural properties.

The views presented are derived from experiences in the field of structural engineering; however, they are applicable to ship hulls. The following points are analysed in turn: materials; loads on ships; and ship structural design and analysis.

AD-636 403 **Field 13J**
CFSTI Prices: HC$2.00 MF$0.50
National Bureau of Standards, Washington, D. C.
INVESTIGATION OF FRACTURE IN THE TI TANKER CAPITAN.
by Morgan L. Williams, and Melvin R. Meyerson. 27 Sep 49, 42p
Prepared in cooperation with Ship Structure Committee, Washington, D. C.

Descriptors: (*Ship hulls, *Fracture (Mechanics)), Tankers, Damage, Ship plates, Steel, Welds, Deformation, Hardness, Tensile properties, Transition temperature, Notch sensitivity.

It is evident that a number of factors contributed to this casualty, and that no single factor, by itself, was sufficient to cause the failure. The following preventive measures are suggested: (1) Steel which is notch sensitive or subject to excessive strain aging should not be used even for nonstrength members attached to the hull structure by welding, since cracks originating in such members may propagate into the hull structure through the welds. (2) In future construction, small welds to heavy plate should be avoided unless adequate precautions are taken, such as preheating. The possibilities of low temperature brazing or other methods of joining for small, lightly loaded attachments such as clips, should be investigated. (3) Adjacent welds, other than those occuring in tee and lap joints, should not be placed so that a notch is formed between them, since even a minor mechanical notch superimposed on a metallurgical notch resulting from the welds may cause serious stress concentration.

AD-636 422 **Field 13J, 11C, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
PROTECTION OF MOORING BUOYS. PART VIII. RESULTS OF SEVENTH RATING INSPECTION.
Technical rept., Sep 65-Mar 66.
by R. W. Drisko. Jun 66, 45p TR-R-458
Proj. Y-F020-03-04-003
See also AD-624 799.

Descriptors: (*Mooring buoys, *Protective treatments), (*Corrosion inhibition, Mooring buoys), Coatings, Degradation, Fouling, Environmental tests, Antifouling coatings, Cathodic protection, San Diego Bay, Isocyanate plastics, Epoxy plastics, Polyester plastics, Bituminous coatings, Phenolic plastics, Vinyl plastics, Zinc compounds, Silicates, Glass textiles, Corrosion.

This is the eighth of a series of reports on the protection of mooring buoys. Thirteen test buoys were given their seventh rating for extent of coating deterioration, corrosion of steel, and fouling. Two other buoys had previously been removed from testing because of advanced deterioration. The coating systems on three of the buoys were in good condition while those on 10 others showed varying degrees of moderate deterioration. Two sets of 13 panels each, coated with the different systems used on the buoys, were given their sixth rating inspection after 3 years of exposure. One set was exposed in San Diego Bay and the other in Port Hueneme Harbor. The condition of the coatings on both sets of panels was generally better than that of the buoy coatings, but there was a general correlation between the conditions of the two test groups. On buoys coated with antifouling paints, no detectable antifouling protection remained after 25 months, but on both sets of test panels, two antifouling paints were still appreciably reducing fouling after 3 years. Three of the buoys were cathodically protected with zinc anodes. The level of protection was high enough to mitigate rusting in the underwater portions of these buoys. (Author)

AD-636 494 **Field 13J, 21F**
CFSTI Prices: HC$2.00 MF$0.50
David Taylor Model Basin, Washington, D. C. Acoustics and Vibration Lab.
UNDERWAY VIBRATION SURVEY OF NS SAVANNAH.
Final rept.
by N. W. Huzil. Jul 66, 31p
Proj. S-F013-11-08
Task 01351
DTMB-2158
See also AD-631 148.

Descriptors: (*Cargo ships, *Nuclear powered vessels), Ship hulls, Vibration, Propeller blades, Stresses, Mathematical analysis, Marine engineering.

Identifiers: Savannah nuclear cargo ship.

Vertical natural hull frequencies for NS SAVANNAH as determined by spectral analysis of vibratory displacements recorded during anchor drop tests compared favorably with those calculated and measured during vibration generator tests. Vertical, athwartship, and torsional vibration amplitudes of the stern, and longitudinal displacement amplitudes of the thrust-bearing housing were measured at blade frequency throughout the speed range. Mode shapes of the hull were measured at resonant conditions. The effect of hull fouling on hull vibratory levels was found to be negligible. The alternating thrust calculated from wake data was in good agreement with shaft strain measurements. Comparison of the forced vibration amplitudes measured at the stern during vibration generator tests with stern amplitudes measured during underway trials gave at 102 rpm an estimated net blade frequency exciting force acting at Frame 219 of plus or minus 21,000 and plus or minus 9,000 lb single amplitude for the vertical and athwartship directions, respectively. The vertical force acting on the hull due to the alternating pressure field at 102 rpm at blade frequency was estimated at plus or minus 19,000 lb single amplitude. (Author)

AD-636 504 **Field 13J**
CFSTI Prices: HC$3.00 MF$0.75
Woods Hole Oceanographic Institution, Mass.
STRENGTH OF THE ALVIN HULLS.
Technical rept.
by Joseph B. Walsh, and James W. Mavor Jr. Apr 66, 60p Ref-66-16
Contract Nonr-3484 (00)
Proj. NR-260-107

Descriptors: (*Submarine hulls, Structural properties), (*Oceanographic vessels, Submarine hulls), Deep submergence, Stresses, Failure (Mechanics).

Identifiers: Alvin (Oceanographic research vessel).

Results are presented of pressure tests, measurements and analyses of the strength of the three pressure hulls constructed for the deep submergence vehicle ALVIN. Comparison of stress distribution as measured in various tests and predicted theoretically is made. Failure of the hull can occur by buckling or by yielding over an appreciable fraction of shell thickness or by yielding at a stress concentration. A DTMB analysis predicts collapse of the three hulls No. 1, 2, and 3 at 7040, 7160, and 6720 psi respectively. No. 1 hull has been tested to 4400 psi. From strain measurements, isolated yielding at the inside surface of hull No. 2 (presently in ALVIN) will occur at a pressure of 5800 psi. However, yielding through the entire section would not occur until near the predicted collapse pressure. The maximum Mises equivalent stress at the test pressure of 3300 psi is 62,200 psi. The comparable material yield strength is 110,000 psi. At a stress concentration in way of the hole in the hull for the release mechanism, local stress is estimated from model data to be 93,000 psi at the test pressure of 3300 psi. A close fitting insert of yield strength 125,000 psi is used with hull No. 2. The strength of the plexiglas viewing ports, the electrical lead-throughs and the hull release mechanism are referenced but not discussed. (Author)

AD-636 635 **Field 13J, 17G**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
THE VESSEL LENGTH CALCULATOR.
Rept. no. 1 (final).
by William B. Brown. 12 Oct 45, 7p 79

Descriptors: (*Ships, Measurement), Physical properties, Target angle, Computers, Navigation computers.

The report deals with the design and use of a Vessel Length Calculator developed at NTS (Recognition), Ohio State University, Columbus, Ohio. While this device was originally intended to be used in the computation of the length of a vessel sighted at sea, under certain known conditions, it has much broader applications to the field of navigation and surveying which, it is felt, could be of value to the Navy Department. A model of this device is submitted, along with a description of its use. (Author)

AD-636 684 **Field 13J, 11F**
CFSTI Price: MF$0.75
American Welding Society, New York.
THIRD TECHNICAL PROGRESS REPORT OF THE SHIP STRUCTURE COMMITTEE; RESEARCH UNDER THE SHIP STRUCTURE COMMITTEE.
Welding Research Council Bulletin Series no. 16.
by E. A. Wright, Finn Jonassen, and H. G. Acker. Nov 53, 70p

Descriptors: (*Ship structural components, *Fracture (Mechanics)), (*Ship hulls, Welds), Steel, Notch toughness, Reinforcing materials, Ships, Merchant vessels, Failure (Mechanics), Statistical analysis, Stresses.

Riveted crack barriers are effective in limiting the propagation of cleavage fractures, but ships with 4 or even 8 such arresters have broken in two. The arresting of a crack is primarily the responsibility of the material; the prevention of crack initiation, on the other hand, depends on the combination of geometry, fabrication and material. Means for increasing notch toughness of steel beyond present requirements are known and can be initiated now if needed. Lowering the average transition temperature of steels may be a more effective way of obtaining generally improved service performance through increased notch toughness. Continuity of structure to provide easy stress flow and the lightest scantlings for the purpose are more important in the design of welded structures than in riveted structures. The nominal breaking stress of full-scale structural components and of the ships themselves can be considerably less than the nominal strength of the material as determined by ordinary tensile tests. As far as possible, welded joints at points of stress concentration should be avoided. Extended development and use of nondestructive subsurface methods of inspection are indicated.

AD-636 733 **Field 13J, 11F**
CFSTI Prices: HC$10.60 MF$0.75
Ship Structure Committee, Washington, D. C.
INVESTIGATION OF FRACTURED STEEL PLATES REMOVED FROM WELDING SHIPS.
Progress summary rept.
by M. L. Williams, M. R. Meyerson, G. L. Kluge, and L. R. Dale. 1 Jun 51, 102p NBS-3
Prepared in cooperation with National Bureau of Standards, Washington, D. C. Rept. no. NBS-3,
See also AD-636 305.

Descriptors: (*Ship plates, *Fracture (Mechanics)), (*Ship hulls, Welds), Steel, Structural properties, Notch sensitivity, Failure (Mechanics), Transition temperature, Tensile properties, Stresses, Defects (Materials).

Samples of fractured plates from 72 ships were examined, and various laboratory examinations and tests were made on 113 plates selected from these samples. Information regarding the structural failures involved was obtained from the cooperating agencies, and the failures were analyzed on the basis of this information combined with the results of the laboratory investigations. The failures usually occurred at low temperatures, and the origin of the fractures could be traced, invariably, to a point of stress concentration at a geometrical or metallurgical notch resulting from design details or welding defects. The fractures in the ships generally were of a brittle or cleavage type, showing little evidence of ductility, although the steels showed normal ductility in the usual type of tensile test. The chemical compositions and ordinary mechanical properties of the fractured plates indicated that the steels met the specification requirements under which they were purchased. However, Charpy V-notch bar tests showed that plates in which fractures originated were more notch sensitive than plates which did not contain a fracture source. Thus, both service experience and the results of the laboratory investigation indicate that the fractures resulted from stress concentration in steels which were notch sensitive at the operating temperature. (Author)

AD-636 739 **Field 13J, 11F**
CFSTI Prices: HC$8.60 MF$0.75
California Univ., Berkeley.
CAUSES OF CLEAVAGE FRACTURE IN SHIP PLATE: HATCH CORNER DESIGN TESTS.
Final rept. 1 Sep 46-15 Aug 47.
by E. Paul DeGarmo, and A. Boodberg. 4 Dec 47, 87p
Contracts NObs-31222, NObs-34231
Proj. SR-92
SSC-16
See also AD-636 743.

Descriptors: (*Ship plates, *Fracture (Mechanics)), (*Ship hatches, Welds), Ship hulls, Merchant vessels, Design, Configuration, Tests, Steel.

This report deals with the testing of 12 full scale hatch corner specimens. One of these was essentially the same as the hatch corner used in the earliest 'Liberty' type ships, and the same as has been used in the earlier test. Two of the specimens tested were invalid due to laminated plates. The others included the modifications of: continuous longitudinal grider; full penetration welds; U.S.C.G. Code 5 and Code 1 modifications, and the effectiveness of the doubler plate in the Code 5 modification; the British Code 1A modification; extended coaming; diagonal braces at the bottom of the girder joint; a new design similar in configuration to the hatches used on Victory type ships; a new design involving a hot-formed double radius corner plate. The strength and energy absorbing abilities of each were determined. The use of an extended coaming was found to be a very effective and simple modification. The design utilizing the formed corner was far superior to all other and produced definitely ductile behavior, a quality which has not before been found in welded hatch corners. (Author)

AD-636 741 **Field 13J, 11F**
CFSTI Prices: HC$4.60 MF$0.75
California Univ., Berkeley.
CAUSES OF CLEAVAGE FRACTURE IN SHIP PLATE: HATCH CORNER TESTS.
Progress rept. 1 Sep 45-1 Mar 46.
by E. Paul DeGarmo, J. L. Meriam, R. C. Grassi, and J. W. Harman. 24 Jul 46, 78p
Contract NObs-31222
Proj. SR-92
SSC-1
See also AD-636 743.

Descriptors: (*Ship plates, *Fracture (Mechanics)), (*Ship hatches, Welds), Ship hulls, Steel, Merchant vessels, Tests, Microstructure, Heat treatment.

Six full scale specimens, similar in design to a hatch corner of a ship, were constructed from a low carbon, ship quality, semi-killed steel and tested to failure. One tested at 120 F gave a shear type fracture. All others tested at room temperature failed with cleavage type fractures. Two which were welded with preheat at 400 F showed superior performance, both in strength and energy absorption. Two which were fabricated by riveting gave inferior performance. An investigation was conducted to determine the effects of preheat and a comparison made with the effects of 1000 F postheat treatment for 8 hours. Studies were made of quarter scale symmetrical and asymmetrical hatch corner models to determine which type of specimen would best duplicate the stress condition existing in actual ships. (Author)

AD-636 742 **Field 13J, 11F**
CFSTI Prices: HC$17.70 MF$1.00
California Univ., Berkeley.
CAUSES OF CLEAVAGE FRACTURE IN SHIP PLATE: FLAT PLATE TESTS.
Technical rept.
by Harmer E. Davis, G. E. Troxell, A. Boodberg, and Earl R. Parker. Apr 46, 181p
Contracts NObs-31222, NObs-34231
Projs. SR-92, NRC-92A
SSC-2
See also AD-636 746.

Descriptors: (*Ship plates, *Fracture (Mechanics)), Ship hulls, Steel, Transition temperature, Failure (Mechanics), Hardness, Experimental data, Loading (Mechanics).

The principal materials used in the tests were three lots of semikilled, hull quality steels. The specimens in the principal program of tests were tested in tension in widths of 72, 48, 24, and 12 in. The specimens all contained a narrow, central, transverse slot having a length of one-fourth of the plate width. Tests were made at each of a number of temperatures in order to determine the range of temperature within which the mode of failure changed from a ductile, shear type to a brittle, cleavage type. In these tests, observations were made to determine the maximum load, failure load, strain distribution across the faces of the plates over several gage lengths, energy absorbed to maximum load, the mode of fracture, and the reduction of thickness near the break. Whenever observations could be made, the load at the development of cracks was also recorded.

AD-636 743 **Field 13J, 11F**
CFSTI Prices: HC$4.60 MF$0.50
California Univ., Berkeley.
CAUSES OF CLEAVAGE FRACTURE IN SHIP PLATE: HATCH CORNER TESTS.
Final rept. 1 Mar-31 Aug 46.
by E. Paul DeGarmo, and J. L. Meriam. 23 Oct 46, 48p
Contracts NObs-31222, NObs-34231
Proj. SR-92
SSC-5
See also AD-636 741.

Descriptors: (*Ship plates, *Fracture (Mechanics)), (*Ship hatches, Welds), Ship hulls, Steel, Design, Configuration, Tests, Merchant vessels, Nickel alloys.

This report deals with the testing of seven large welded steel specimens similar in design to a square hatch corner of a ship. These were the last seven in a series of 26 such specimens which were tested to determine the performance of seven types of steel when built into a welded structure which had severe restraint to plastic flow due to a designed discontinuity. One of the last seven specimens was constructed of a 3-1/3 per cent nickel alloy steel and two from a low carbon steel having 0.82 per cent manganese. The others were made of three grades of plain carbon ship quality steel. Preheating at 400F was used on three of the specimens. The effect of preheating was very beneficial. The specimen constructed from nickel steel absorbed rather little energy before failure. This was attributed to the high yield strength of this material which prevented plastic flow of the plate before failure of the welded joints. (Author)

AD-636 746 **Field 13J, 11F, 13K**
CFSTI Prices: HC$20.00 MF$1.00
California Univ., Berkeley.
CAUSES OF CLEAVAGE FRACTURE IN SHIP PLATE: FLAT PLATE TESTS AND ADDITIONAL TESTS ON LARGE TUBES.
Final rept.
by Harmer E. Davis, G. E. Troxell, Earl R. Parker, A. Boodberg, and M. P. O'Brien. 17 Jan 47, 194p
Contracts Nobs-34231, NObs-31222
Proj. SR-92
SSC-8
See also AD-636 742.

Descriptors: (*Ship plates, *Fracture (Mechanics)), (*Pipes, Fracture (Mechanics)), Loading (Mechanics), Steel, Nickel alloys, Transition temperature, Experimental data, Microstructure, Notch sensitivity.

The materials used in this investigation were three lots of semi-killed hull quality steels, one lot of nickel alloy, one lot of fully killed, and one lot of fully-killed quenched and drawn steel. The specimens used in the principal program were 3/4 inch thick plates containing a narrow transverse slot having a length equal to one fourth of the specimen width. These were tested in tension in widths ranging from 12 inches to 108 inches. Tests were made at each of a number of temperatures in order to determine the temperature at which the mode of failure changed from shear to cleavage type. In the tests, observations were made of the following: the maximum load, load at development of cracks, fracture load, energy absorbed to maximum load, mode of fracture, strain distribution over the faces of plates and thickness reductions near the lines of fracture.

AD-636 749 **Field 13J, 11F**
CFSTI Prices: HC$11.60 MF$0.75
Cornell Univ., Ithaca, N. Y.
FATIGUE TESTS OF SHIP WELDS.
Progress rept.
by S. C. Hollister, J. Garcia, and T. R. Cuykendall. 13 Dec 46, 114p
Contracts NObs-31218, NObs-34231
Proj. SR-89
SSC-7

Descrip tors: (*Ship plates, *Fatigue (Mechanics)), (*Ship hulls, Welds), Welding, Loading (Mechanics), Tests, Surface properties, Fracture (Mechanics), Reinforcing materials, Radiography, Steel.

The results of fatigue tests of twenty-eight specimens representing typical ship welding problems are described. Stress range of zero-to-30,000 psi tension was applied to 11 1/2 in wide plates having a longitudinal weld in the direction of tension and to 17 in plates with central holes whose boundary was flame cut, flame cut and ground, flame cut and machined, and which had welded reinforcing inserts. Variation in number of weld passes in the longitudinal weld from 1 to 3, each side, is not believed to affect the fatigue behavior significantly, but irregularities such as folds or pits in the weld surface are shown to act as stress raisers and to initiate failure. Tests were made on welds whose surfaces were ground smooth and flush with those of the plate. Two specimens of 50% greater width, and two of another steel, showed no difference in fatigue behavior from the balance of specimens of similar nature. The backstep method of laying weld passes is shown to be superior to the continuous technique. The results of tests of eight specimens with central holes emphasizes the fact that discontinuities of form and stiffness require special treatment to provide paths free of stress raisers. (Author)

AD-636 752 **Field 13J, 11F**
CFSTI Prices: HC$12.60 MF$1.00
Pennsylvania State Univ., University Park.
CORRELATION OF LABORATORY TESTS WITH FULL SCALE SHIP PLATE FRACTURE TESTS.
Progress rept.
by M. Gensamer, E. P. Klier, T. A. Prater, F. C. Wagner, and J. O. Mack. 19 Mar 47, 129p
Contracts NObs-31217, NObs-34231
Proj. SR-96
SSC-9
See also AD-636 733.

Descriptors: (*Ship plates, *Fracture (Mechanics)), Steel, Impact tests, Experimental data, Graphics, Metallography, Merchant vessels, Ship hulls, Transition temperature, Microstruc ture.

The report summarizes the results which have been obtained to date on notched beam impact testing, and metallographic examination of the ship plate steels. In Part I of this report it is shown that the standard Charpy impact test using either the V- or keyhole-notch or a special 3/4 in. wide specimen is not capable of evaluating the ship plate according to the data which have been obtained for large plate specimens. However, by using Charpy keyhole-notch specimens which have been strained 10% in tension and which have been allowed to stand at room temperature for one month, test data have been obtained which allow the prediction with fair accuracy of the transition temperature in the large plates. In Part II the microstructures of the project steels have been considered. It has been shown that no simple alteration in microstructures can be found to account for the profound variation in energy absorption characteristics in the series of steels which have been studied. It has been shown that variations in grain size in a given steel cause large changes in the energy absorption characteristics of that steel. (Author)

AD-636 926 **Field 13J**
CFSTI Prices: HC$2.00 MF$0.50
San Francisco Bay Naval Shipyard, Vallejo, Calif. Rubber Lab.
DEVELOPMENT OF DAMPING TREATMENTS FOR NEW CONSTRUCTION SUBMARINES.
Progress rept.
14 Jun 61, 32p Rept. nos. 94-29, PR-7
Proj. S-F013-13-01
Task 908

Descriptors: (*Submarine hulls, *Damping), (*Vibration isolators, Submarines), Ship structural components, Vibration, Viscoelasticity, Fibers, Aluminum, Metal plates, Marine engineering.

The work reported herein was a continuation of an investigation authorized by the Bureau of Ships for the purpose of developing vibration damping treatments for thick bulkheads and for webs of deep hull frames of submarines. Each tested treatment consisted of a viscoelastic layer of chromated felt, 1/8-inch thick, and a constraining layer of aluminum plate which was either 1, 0.5, or 0.25-inch thick, depending on the treatment. Each treatment was applied to the two flat sides of 1 3/4 or 3/4-inch thick steel bars, and was fastened to them by means of studs, nuts, and washers. Damping of flexural vibrations in the frequency range of 50 to 1500 cps was determined. It was found that damping increased linearily with the logarithm of the constraining pressure applied to the visco-elastic layer. It was also found that after applying a high constraining pressure the latter could be greatly reduced without appreciably affecting damping behavior. The highest average damping over the frequency range of 50 to 1500 cps, namely 10% of critical damping, was obtained with treatment 170, at a constraining pressure of 80 psi. This treatment consisted of a one-inch thick aluminum layer and a 1/8-inch thick felt layer secured to both sides of the test bar with 5/8-inch diameter studs. Application of high constraining pressure at the studs caused the constraining layers in some instances to bulge between the studs. This bulge tended to prevent the attainment of high damping efficiency by the treatments. Spacing of the studs affected the magnitude of the bulge. (Author)

PB-170 906 **Field 13J, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Arctic Inst. of North America, Washington, D. C.
POLAR SHIPHANDLING.
by Edwin A. McDonald. Sep 65, 63p
Grant NSF-GA=105

Descriptors: (*Icebreakers, Polar regions), (*Polar regions, Icebreakers), Navigation, Ice, Helicopters, Aerial reconnaissance, Mooring, Freezing, Maneuverability, Hydrographic surveying, Shipborne, Explosive materials.

CONTENTS: Introduction to Ice Navigation; Preparing for the Ice; Procedures to be Followed After a Vessel Sails to the Polar Regions; Entry into Sea Ice Areas; Entering the Ice; Icebreaking; Helicopter Ice Reconnaissance; Ice Convoy; Towing in Ice; Use of Explosives; Channels in Shore-Fast Ice; High Latitude Navigation; Getting Ashore; Shipboard Hydrography; Freezing-In and Wintering-Over Procedures.

AD-636 436 **See Field 10B**

AD-636 700 **See Field 11C**

AD-636 915 **See Field 10B**

AD-636 920 **See Field 18L**

AD-636 923 **See Field 20A**

13K. PUMPS, FILTERS, PIPES, FITTINGS, TUBING, AND VALVES

AD-636 321 **Field 13K, 13M**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
BLAST-CLOSURE VALVES.
Final rept.
by F. Hughes-Caley, and R. Kiang. Aug 65, 95p
Contract OCD-PS-64-201
Proj. SRI-4949-211

Descriptors: (*Shelters, Valves), (*Valves, Ventilation), Blast, Operation, Design, Performance (Engineering).

Four candidate blast closure valves for the ventilation openings of the domestic type personnel shelter are investigated theoretically. The calculated closing times of all four are one tenth or less of the required closing time, which is defined as the longest time the closure valve may stay open before the pressure build-up in the shelter exceeds the tolerable limit. For a 50-person shelter with an assumed tolerable limit of 5 psig pressure rise in the shelter, the longest required closing times for 100, 80, 60, and 40 psig ambient overpressures are 60, 75, 110, and 140 msec, respectively. Since analysis indicates that all four of the investigated candidate valves should close at rates much faster than these, the choice among valves will be determined only on the basis of reliability and cost. If sufficient confidence can be established in the physiological data given in Appendix F, the tolerable limit of pressure rise can be elevated to 23 psig (see Appendix E). In that case, ventilation openings will not require blast closures provided of course that the openings are well protected from penetration of blast-borne missiles and debris that might damage ventilating and other equipments or injure personnel. (Author)

AD-637 074 **Field 13K, 14B**
Systems Research Labs., Inc., Dayton, Ohio.
USE OF MOLYBDENUM IN GETTER ION PUMPS.
by A. G. Jackson, and T. W. Haas. 11 Oct 65, 5p
Contract AF 33 (615)-1047
Proj. AF-7021
ARL-66-0089

Descriptors: (*Vacuum pumps, Cathodes), (*Molybdenum, Cathodes), Purification, Sputtering, Ions.

Identifiers: Ion getters.

Of many papers concerning operating characteristics of getter ion pumps, few references to the effect of the composition and purity of the Sputtered cathodes exist. The increased performance in many cases of mixed getters over single components is well known. These results, though preliminary, do indicate that better choices than pure titanium cathodes are available for use in ion pumps. (Author)

N66-17892 **Field 13K**
CFSTI Prices: HC$6.00 MF$1.50
General Electric Co., Cincinnati, Ohio.
ELECTROMAGNETIC ALKALI METAL PUMP RESEARCH PROGRAM.
Final rept., 27 Jun 63-3 Aug 64.
by R. G. Rhudy, and J. P. Verkamp. Mar 66, 246p
Contract NAS3-2543
NASA-CR-380

Descriptors: *Coolant, *Alkali metal, *Electromagnetic pump, *Power supply.

For abstract, see T 66 18.

AD-636 600 **See Field 11F**

AD-636 746 **See Field 13J**

13L. SAFETY ENGINEERING

AD-636 794 **Field 13L, 15F**
CFSTI Prices: HC$2.00 MF$0.50
Dikewood Corp., Albuquerque, N. Mex.
PRELIMINARY INVESTIGATION OF FIRESTORM START-CRITERIA.
Technical note.
by Thomas E. Lommasson. 15 Jun 65, 42p DC-TN-1050-1
Contract OCD-PS-65-53
Proj. 2611A

Descriptors: (*Fires, Theory), Energy, Urban areas, Nuclear explosions, Wind, Gas flow.

A quantitative hypothesis is developed that relates inrush wind velocity at the edge of a potential firestorm area to the energy release rate of fires within the area and to the size of the area itself. The effects of spread from initial fires are considered and criteria are derived to estimate the way in which the fires are likely to develop with time. The hypothesis was applied to German World War II firestorm and group fire situations and appears to yield reasonable results in predicting the occurrences of each. The hypothesis may be applied to nuclear attacks against urban target areas. (Author)

13M. STRUCTURAL ENGINEERING

AD-636 417 **Field 13M, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
POLAR CAMP IMPROVEMENTS REQUIREMENTS AND CONCEPTS FOR COVERED STORAGE FACILITIES.
Technical rept.
by G. E. Sherwood, and J. P. Cosenza. Jun 66, 20p
TR-R-457
Proj. Y-F015-11-01-105

Descriptors: (*Warehouses, Polar regions), Civil engineering, Buildings, Snow, Shelters, Feasibility studies.

A study of storage facilities in polar camps showed a need for improved facilities for camps on areas of drifting snow. Equipment and materials stored in the open become drifted over and require costly manpower for digout. Damage during storage and digout is also costly. Digout can cost $400 to $600 per piece of equipment following winter storage or prolonged storms. The use of a lightweight, easily erected, low-cost storage shelter should produce savings in manpower and materials. Available information indicates that such a shelter would cost $1.50 to $2.00 per square foot. A storage basement under a building on a snowfield would also provide covered storage space at a very low cost. It was concluded that a study should be made to determine the feasibility of lightweight, easily erected, low-cost storage shelters for use on areas of drifting snow. Also, a prototype storage basement should be constructed under a Jamesway with a Naval Civil Engineering Laboratory steel foundation so that its practicality for storing supplies, small items, and frozen foods can be evaluated. (Author)

AD-636 440 **Field 13M, 15C, 18C**
CFSTI Prices: HC$4.00 MF$0.75
IIT Research Inst., Chicago, Ill. Technology Center.
DEBRIS DISTRIBUTION.
Research rept. (final).
by D. I. Feinstein. Mar 66, 118p IITRI-M6066
Contract OCD-PS-64-50
See also AD-422 319.

Descriptors: (*Nuclear explosion damage, Urban areas), (*Debris, Distribution), Structures, Demolition.

This study is a continuation of the 'Debris Clearance Study.' That study developed methods of estimating gross debris accumulation in various types of urban areas, based on total structural demolition and uniform distribution of the debris over a given size area. The present study makes use of several of the tools developed in the previous report and expanded herein to more accurately predict the debris distribution. Structural fragmentation is defined for a particular set of blast and structural parameters. The trajectories of the transportable material are calculated, and the distribution of this material is found by size as well as mass. In order to establish the credibility of the fragmentation theories which were developed, a series of experiments were conducted on brittle beams under dynamic loading. A sample problem is worked out that utilizes the above techniques on a hypothetical building to illustrate how the building's debris distribution may appear under various conditions of building height and fragment size distribution. (Author)

AD-636 488 **Field 13M, 20K**
CFSTI Prices: HC$4.00 MF$0.75
ARA, Inc., West Covina, Calif.
RESEARCH ON ENERGY ABSORBING STRUCTURES, PART IV.
Summary scientific rept., Feb 65-Feb 66.
by Bernard Mazelsky, S. Uchiyama, D. L. Platus, Fu-kong Tzung, and T. H. Lin. Mar 66, 108p
ARA-70
Contract AF 49(638)-1521
Proj. AF-0782
Task 078201
AFOSR-66-0627

Descriptors: (*Structures, Scientific research), Models (Simulations), Metals, Absorption, Energy.

The present program is concerned with developing the appropriate analytical techniques utilizing selected metallic model structures for the very-large-deflection behavior of plate and shell structure. Deflection measurements were made using both flat plate and curved shell specimens, supported at one edge and loaded at the opposite end. Both uniform and corner loadings were employed. The experimental data was then correlated with the analytical results. For this purpose, a previous solution was used for the case of large deflections of cantilever beams subjected to uniform edge loading. For the non-uniform loading and curved shell case, an IBM computer program was developed in order to correlate the analysis with the experimental results. The IBM program did not lead to practical results for the general plate-like or curved shell problem unless an impractical grid or large number of node points were used. An alternate analytical approach was then taken wherein the numerical procedure was simplified considerably. Unfortunately, sufficient time was not available to obtain the numerical results at the time of the preparation of this report. During this year's program, a limited investigation was made of the characteristics of the displacement type damper. It was shown that if this damper is used in a spring-mass-system, the maximum percent critical damping possible is 30% before the damper prevents the restoration of the mass to its initial zero displacement. (Author)

AD-636 666 **Field 13M**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
CERTAIN PROBLEMS OF THE COMPLEX MODULUS OF A FOUNDATION UNDER DYNAMIC LOADING.
by Pan Fu-yee. 4 Apr 66, 19p FTD-TT-65-885
TT-66-61952
Edited trans. of T'u Mu Kung Ch'eng Hsueh Pao (Chinese People's Republic) v10 n1 p43-9 1964.

Descriptors: (*Foundations (Structures), Loading (Mechanics)), Dynamics, Modulus of elasticity, Pressure, Sand, Soils, China.

The paper presents certain research results on determination of the complex elastic moduli of foundations consisting of loess, a sand base layer and fill. The effect of the base layer must be taken into account in determining the complex elastic moduli of a stratified foundation; approximate formulas are also proposed to allow for the area of the foundation and the effect of pressure; when a weak foundation is reinforced with a sand footing, there is a marked increase in its complex modulus. The complex modulus of a fill foundation is lower than that of the same type of earth in its natural state. (Author)

AD-636 766 **Field 13M, 15F, 18C**
CFSTI Prices: HC$24.80 MF$1.50
Federal Civil Defense Administration, Battle Creek, Mich.
BLAST EFFECTS OF ATOMIC WEAPONS UPON CURTAIN WALLS AND PARTITIONS OF MASONRY AND OTHER MATERIALS.
by Benjamin C. Taylor. Aug 56, 270p
AFSWP-WT-741
Rept. on Operation Upshot-Knothole, Proj. 3.29.

Descriptors: (*Nuclear explosion damage, *Buildings), Blast, Vulnerability, Structures, Nuclear weapons, Damage assessment, Civil defense systems, Civil engineering.

Identifiers: Upshot-Knothole operation.

Blast-resistance tests were made during Shot 9 on various types of wall panels and interior partitions. Buildings were rectangular test cells, open at the front and rear, having reinforced-concrete floor slabs, roof slabs, and dividing walls. Windowless test wall panels were built into the cell openings for the full height and width. The cells contained interior test partitions of many types and were enclosed with windowed masonry walls in front and solid masonry walls at the rear. Two ranges were selected for each of the building types, one at about 4.5-psi peak side-on overpressure and the other at about 7.5-psi peak side-on overpressure, in order to bracket the collapse overpressure levels for the standard construction of the test panels and partitions. The test was originally planned for comparative purposes. Subsequently, it became possible to provide some instrumentation, but not enough for a detailed analysis. Interior pressures were not recorded and the rear wall loadings had to be estimated for the analysis. The orientation of the cells to the shot was not as expected, possibly affecting the results to some degree. Laboratory tests of the component wall materials were not complete, and estimates had to be made of certain of these properties. Also, variation in the quality of construction of the test wall panels probably affected the results. Numerical integration was used for computation of wall response. Adjustments were made to the unknown variables to correlate the theoretical and observed results. Motion picture records were obtained at a rate of 64 frames per second, and selected frame sequences are included. The heavy dust conditions made many of the pictures unusable. (Author)

AD-636 787 **Field 13M**
CFSTI Prices: HC$3.00 MF$0.50
Illinois Univ., Urbana.
A COMPARISION OF THEORY AND EXPERIMENT FOR SHIELDING BY A STRUCTURE AGAINST FALLOUT RADIATION.
Final rept. Jun 65-Aug 66 on Nuclear Radiation Shielding Studies.
by Kenneth Preiss, and Arthur B. Chilton. Jun 66, 58p NRSS-1
Contract OCS-OS-63-66

Descriptors: (*Fallout shelters, Effectiveness), Shielding, Roofs, Iron, Concrete, Theory, Radioactive fallout.

A comparison is made between experiment and theory for the calculation of shielding by a structure against fallout radiation. Experimental results for exposure penetrating a roof slab, and for reduction factor, are found to agree with moments theory calculations, often to better than 10% when the geometry factor L sub a (omega, X) was used. A comparison between experiment and theory may be inaccurate due to anisotropy of the experimental source, to lack of source reflection in roof experiments, and due to error in estimating the thickness of the roof. The magnitudes of the errors due to these effects are investigated, and found to be small, but not necessarily negligibie. Detailed results of penetration in iron and concrete, due to plane isotropic sources of various energies are given, and a review of ground contribution to fallout radiation penetration through simple structures is appended. (Author)

AD-636 914 **Field 13M, 20K**
CFSTI Prices: HC$5.00 MF$1.25
Naval Civil Engineering Lab., Fort Hueneme, Calif.
RESISTANCE OF TUBULAR STRUCTURES TO DYNAMIC LOADING.
Final rept. Apr-Nov 65.
by S. K. Takahashi, W. E. Gates, and K. L. Benuska. Jul 66, 192p TR-R-463

Descriptors: (*Loading (Mechanics), *Radio towers), (*Radiation damage, Structures), Microwave equipment, Model tests.

Static and dynamic experimental investigations were conducted to validate the NFEC computer program used to predict the behavior of microwave towers subjected to blast loading. Five small-scale towers representative of the prototype were made of composite sheet steel and microconcrete. The inside and outside diameters were 10.7 and 12.4 inches, respectively, and the height was about 39 inches. The following tests were conducted: static and dynamic tests on steel and concrete specimens; static tests on a simply supported tubular beam and on a cantilever model; and dynamic tests on three model towers - free-vibration tests, base-acceleration shock-pulse tests on a vibration machine, and air-blast tests in a 6-foot shock tube. The failure mode for the statically loaded beam and cantilever tower was of the same type as for the dynamically loaded cantilever tower: a semicircular bulge occurred in the inside and outside steel cylinders at the location of maximum moment in

the compression zone. Models tested in the shock tube failed at peak overpressures of 44.4 psi. The model tests showed the NFEC computer program can predict the behavior of small cantilever towers under different types of dynamic loading, thus increasing the level of confidence in the program's prediction of strength for the prototype tower. (Author)

AD-637 112 **Field 13M, 8L**
CFSTI Prices: HC$2.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
SPREAD FOOTING FOUNDATIONS ON SNOW.
Technical rept.
by Sherwood C. Reed. Apr 66, 46p TR-175
Proj. DA-1V025001A13001

Descriptors: (*Snow, *Foundations (Structures)), Civil engineering, Structures, Greenland.

A series of nine spread footing tests was installed on snow at Camp Century, Greenland, in 1961 and continuously observed through the 1963 summer season. The influence of footing load, size and shape on settlement were investigated and the effects of the uncontrolled parameters temperature and snow density were recorded. (Author)

AD-637 128 **Field 13M**
CFSTI Prices: HC$1.00 MF$0.50
Brooks and Perkins, Inc., Detroit, Mich.
DEVELOPMENT OF A LIGHTWEIGHT CABLE DRIVEN, TELESCOPIC MAST.
Quarterly rept. no. 3, 29 Oct 65-28 Apr 66.
by J. R. Harris. Jul 66, 11p Rept. no. 317
Contract DA-28-043-AMC-01336 (E)
Proj. DA-1G6-40306-D-488
Task 1G6-40306-D-488-08
ECOM-01336-3

Descriptors: (*Antenna masts, Extendable structures), Hoists, Ground vehicle antennas, Cables (Mechanical), Drives, Dipole antennas, Performance (Engineering).

This report covers the progress made in the development of a manually actuated, cable driven, telescopic antenna mast, which will meet the requirements of Specification SCL-7805. The mast and its operation is reviewed. Three masts have been completed and are being tested. Static load tests have been completed; environmental and cycling tests are approximately 40% complete. (Author)

N66-16189 **Field 13M**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Cocoa Beach, Fla. John F. Kennedy Space Center.
THE PROBLEM OF LOW LEVEL WIND DISTRIBUTION.
by J. H. Deese, and C. C. Whisenant. 1964, 104p
NASA-TM-X-57159
Presented at the Structural Engr. Councils of Fla., Ann. Conf. (1st) Tampa, Nov 9 1964.

Descriptors: *Hurricane, *Storm, *Weather, *Wind variation, *Meteorology.

For abstract, see T 66 18.

ORNL-NSIC-12 **Field 13M, 5B, 18I**
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn. Nuclear Safety Information Center.
INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-3.
Nov 65, 121p
Contract W-7405-eng-26

Descriptors: (*Bibliographies, Safety), (*Safety, Bibliographies), (*Nuclear engineering, Safety).

ORNL-NSIC-14 **Field 13M, 5B, 18I**
CFSTI Prices: HC$6.00 MF$1.25
Oak Ridge National Lab., Tenn. Nuclear Safety Information Center.
INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-4.
Mar 66, 217p
Contract W-7405-eng-26

Descriptors: (*Bibliographies, Safety), (*Safety, Bibliographies), (*Nuclear engineering, Safety).

ORNL-NSIC-8 **Field 13M, 5B, 18I**
CFSTI Prices: HC$4.00 MF$1.00
Oak Ridge National Lab., Tenn. Nuclear Safety Information Center.
INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-1.
Apr 65, 150p
Contract W-7405-eng-26

Descriptors: (*Bibliographies, Safety), (*Safety, Bibliographies), (*Nuclear engineering, Safety).

ORNL-NSIC-9 **Field 13M, 5B, 18I**
CFSTI Prices: HC$6.00 MF$1.25
Oak Ridge National Lab., Tenn. Nuclear Safety Information Center.
INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-2.
Aug 65, 204p
Contract W-7405-eng-26

Descriptors: (*Bibliographies, Safety), (*Safety, Bibliographies), (*Nuclear engineering, Safety).

AD-636 321 **See Field 13K**

AD-637 044 **See Field 11F**

14A. COST EFFECTIVENESS

AD-417 194 **Field 14A**
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.
TOWARDS A NEW SYSTEM FOR ALLOCATING THE COST OF CAPACITY.
by E. B. Berman. 27 May 60, 15p P-2001

Descriptors: (*Costs, Mathematical analysis), (*Weapon systems, Costs), Military requirements, Military facilities, Probability, Integral equations, Construction.

A concept of capacity cost is presented. In this new capacity cost system a requirement for an additional unit of capacity does not lead either to no cost if the unit is already available or to the full cost of building an additional unit if it is not already available. The former event implies a cost because it advances the time when we should expect to construct an additional unit of capacity. The latter event offers a savings to offset the full cost of constructing a unit of capacity in the form of a probability that the unit we construct now would have been needed for the next generation anyway. The term capacity is used in a functional sense; thus included in capacity are facilities, support equipment, support organizations, and personnel which have significant initial costs and to which the concept of capacity therefore appertains.

AD-636 497 **Field 14A, 12B, 15C**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
ON THE ROLE OF THE COST ANALYST IN A WEAPON SYSTEM STUDY.
by J. J. Kermisch, and A. J. Tenzer. May 66, 23p P-3360

Descriptors: (*Weapon systems, *Cost effectiveness), Management planning, Decision making, Operations research, Antimissile defense systems.

There are two ideas which have motivated this paper: first, that the role of the cost analyst is not to appear after decisions are made and provide some kind of estimate which justifies the decisions; and, secondly, that cost analysis is not an activity which is carried out by itself, but is an important part of a larger analytic activity which is sometimes called systems analysis, sometimes cost-effectiveness analysis, and sometimes cost-utility analysis. This larger activity attempts to examine alternative means of achieving specific goals with the ultimate intention of making the best possible decisions. The main intent of this paper is to show how the cost analyst can usefully participate in this analytic process and provide insights which contribute to the making of the aforementioned 'best possible decisions.' (Author)

AD-636 554 **See Field 12B**

14B. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-449 874 **Field 14B, 4B**
CFSTI Price: HC$3.60
Army Electronics Research and Development Activity, Fort Huachuca, Ariz. Meteorology Dept.
AN EVALUATION OF RADIATION COMPENSATING THERMOCOUPLE TEMPERATURE SENSORS.
by Arthur V. Carlson. Sep 64, 35p
USAERDAA-MET-10-64
Proj. DA-1-G-6-50212-A-127-01/23
Rept. on Instrumentation and Techniques Improvement.

Descriptors: (*Thermocouples, Atmospheric temperature), Surface temperature, Instrumentation, Shielding, Temperature sensitive elements, Heat, Thermal radiation, Meteorological phenomena, Solar radiation, Performance (Engineering).

Identifiers: Sensors.

A copper constantan thermocouple temperature sensor designed to automatically compensate for the effect of radiation sources or sinks in the field of view of the sensor is evaluated as a meteorological air temperature sensor. Performance is compared with a conventional thermocouple sensor during various exposures, both shielded and unshielded from solar radiation and clear night sky. Findings indicate the compensated sensor is superior to a shielded conventional sensor. (Author)

AD-636 375 **Field 14B, 20M**
CFSTI Prices: HC$3.00 MF$0.75
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ON A READOUT TECHNIQUE FOR MONOCHROMATIC INFRARED GAS TEMPERATURE MEASUREMENT.
Master's thesis.
by David H. Murray. Jun 66, 68p GA/ME/65-2A

Descriptors: (*Gases, Temperature), Radiation pyrometers, Infrared equipment, Carbon dioxide, High-temperature research, Low-pressure research.

Identifiers: Readout systems.

It was desired to measure the temperature of a high velocity, high temperature, low density moving gas without disturbing the flow. The natural infrared energy loss of the gas led to an Infrared Monochromatic Radiation (IMRA) pyrometer as a measuring instrument, using the 4.5 micron CO2 band. The normal CO2 content in air is insufficient for absorption measurements to be made and additional CO2 seeding is required at gas pressures less than 1.5 atmospheres. Early attempts to prove this seeding method failed due to the

IMRA pyrometer's excessive noise and drift. A new circuit conditioning and readout technique was designed and now permits the measurement of temperature within 5 per cent to be made to pressures of 0.01 atmosphere or less. (Author)

AD-636 500 **Field 14B, 22B, 8N, 4A K**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
AEROSPACE INSTRUMENTATION: COMPILATION OF ABSTRACTS.
by Jordan V. Randjelovic. 18 May 66, 60p ATD-66-58
TT-66-61895
See also AD-633 104. Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Spacecraft, *Instrumentation), Russia, Abstracts, Magnetometers, Cosmic rays, Detection, Pressure gages, Spectrum analyzers, Radiation measurement systems, Electromagnetic waves, Measurement, Spaceborne.

This compilation of abstracts is based on Soviet open sources published 1965-1966. It is the third in a series of reports reviewing Soviet developments in aerospace instrumentation. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. The 34 abstracts are arranged alphabetically by author within each of the following categories: 1. Magnetometer studies (4 entries); 2. Cosmic and corpuscular radiation detection (23 entries); 3. Electromagnetic radiation (6 entries); 4. Pressure sensors (1 entry). Other information included: world magnetic survey program experiments, ferroprobe gradiometer, Earth's magnetic field measurement, upper atmosphere soft electron fluxes, cosmic radio emission intensity, particle studies, outer ionosphere composition, satellite radiometric instrumentation, Cosmos and Electron satellite investigations, geometric distribution and composition of particles in the Earth's radiation belts, charged particle recording and investigation. The bibliography at the end of the report comprises 34 entries. (Author)

AD-636 570 **Field 14B, 13A**
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
DRY ICE-METHANOL BATH FOR TEMPERATURES DOWN TO -70C.
by G. S. Kell, G. E. McLaurin, and G. C. Ford.
31 Jan 66, 2p
NRC-9026

Descriptors: (*Refrigeration systems, Low-temperature research), Canada, Carbon dioxide, Solidified gases, Methanols, Temperature control, Laboratory equipment.

For abstract, see T 66 18.

AD-636 674 **Field 14B, 8D, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SPECTROMETER FOR OBSERVATION OF ELECTRON PARAMAGNETIC RESONANCE IN SOLID BODIES.
by A. M. Belonogov, and A. M. Sazonov. 25 May 66, 12p FTD-TT-65-1735
TT-66-61959
Unedited rough draft trans. of Geofizicheskoe Priborostroenie (USSR) n16 p94-101 1963.

Descriptors: (*Paramagnetic resonance, Spectrum analyzers), (*Minerals, Paramagnetic resonance), Microwave spectroscopy, Instrumentation, Klystrons, Frequency modulation, Tuning devices, Spinels, Garnets, Spectroscopy, USSR.

Identifiers: Andradite.

A description is given of a superheterodyne EPR spectrometer which features automatic sub-tuning of the klystron signal frequency. Results obtained using this instrument to study natural spinel and adrandite are given.

AD-636 717 **Field 14B, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Naby, Washington, D. C.
SMALL SIZE MASS SPECTROMETER OF HIGH RESOLUTION WITH A NON-HOMOGENEOUS MAGNETIC FIELD FOR ANALYZING LIGHT GASES.
by N. E. Alekseevskii. 1 Aug 66, 5p Translation-2210
TT-66-61963
Trans. of Akademiya Nauk SSSR. Doklady, v166 n5 p1088-90 1966.

Descriptors: (*Mass spectroscopy, *Spectrum analyzers), Magnetic fields, Magnetics, Gas analysis, Resolution, Atomic energy levels, Sensitivity, Vacuum apparatus, USSR.

A mass spectrometer of a new design with a non-homogeneous field for the analysis of light gases is described. A small permanent magnet can be employed, and because of the non-homogeneous field, a high resolution can be obtained which is necessary for resolution of multiplets without excessively decreasing the width of the slits, i.e., while retaining an adequate aperture ratio for the instrument. The length of the ion path in such an instrument is smaller than in a mass spectrometer with a homogeneous field of equal dispersion. For this reason, the scattering of ions in the molecules of residual gas, and consequently, the background of scattered ions, is less than in an instrument with a homogeneous field. This makes it possible to obtain a higher actual sensitivity of the mass spectrometer to small amounts of impurities. The special feature of the instrument is that its basic parts, the ion source and receiver, as well as the analyzing magnet, are contained in a cylindrical vacuum chamber, which is a direct continuation of a high-vacuum diffusion lamp. This chamber also serves as the housing for the entire instrument. (Author)

AD-636 864 **Field 14B**
Army Biological Labs., Frederick, Md.
STUDY OF THE VIBRATING REED IN THE PRODUCTION OF SMALL DROPLETS AND SOLID PARTICLES OF UNIFORM SIZE.
by W. R. Wolf. 15 Jun 61, 6p

Descriptors: (*Vibrators (Mechanical), Particles), (*Particles, Preparation), (*Droplets, Preparation), Colloids, Aerosols, Sprays, Instrumentation.

The production of uniformly sized droplets of pure liquids, solutions, suspensions, and of solid particles in the size range of 4 to 200 microns in diameter employing the vibrating reed is described. Salient features of the various devices are discussed where particular attention is devoted to the stability in size uniformity of the droplets or particles produced and their mechanism of formation. The methods described have found application in a variety of fundamental investigations, such as droplet evaporation and plant growth regulator studies, but their inherent low capacity makes them less suited for large-volume aerosols or sprays as are encountered, for example, in spray drying. (Author)

AD-636 949 **Field 14B, 8K**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst., of Tech., Cambridge. Instrumentation Lab.
INVESTIGATION OF TRANSIENT AND LONG-PERIOD TILTS AND OF TRANSLATION VIBRATION CHARACTERISTICS OF A GYRO TEST AREA.
Technical rept.
by Robert L. King. Apr 66, 27p E-1732
Contract AF 29 (600)-5478
MDC-TR-66-67

Descriptors: (*Test facilities, Stability), (*Gyroscopes, Test facilities), Seismology, Vibration, Deflection, Errors, Measurement.

A seismic survey of an area scheduled for use as a single-degree-of-freedom floated rate-integrating gyroscope test station is described. Evaluation is made of long-period tilt and short-period vibrations which are functions of both cultural activity and local disturbances. Errors introduced into a single-degree-of-freedom floated rate-integrating gyroscope due to cultural activity and local disturbances are presented in graphical form. Short-period angular and translation vibrations over a frequency range up to 5000 cps are defined. Calculations are made to determine the total maximum errors which could be introduced into a single-degree-of-freedom floated rate-integrating gyroscope by angular vibrations and translation acceleration. It is shown that the largest single error occurs in the frequency range from 1 to 10 cps. This error, based on the limit of resolution of approximately 55% of the total contributing error. (Author)

AD-636 972 **Field 14B, 21H**
CFSTI Prices: HC$1.00 MF$0.50
Rocket Propulsion Establishment, Westcott (England).
TECHNIQUES FOR DROP SIZE MEASUREMENT BY DIRECT PHOTOGRAPHY AND ELECTRONIC PARTICLE SIZE ANALYSIS.
Technical rept.
by C. Ramshaw. Dec 65, 24p RPE-TR-65/9

Descriptors: (*Sprays, Particle size), (*Droplets, Measurement), Photographic analysis, Photographic images, Optical equipment, Fuel sprays, Combustion chambers, Rocket motors (Liquid propellants), Great Britain.

A photographic technique is described which overcomes many of the problems encountered in measuring the droplet size distribution in sprays. Droplet photographs were analysed using a Mullard Particle Size Analyser as recommended in the text and it is shown that, for photographs in which the depth of field is less than the spray thickness, a high contrast emulsion leads to errors. In general it is better to avoid out-of-focus drops, but a method is suggested which permits the results to be corrected provided the extent of the spray is large compared to the depth of field. (Author)

AD-637 081 **Field 14B, 10C, 9A**
CFSTI Prices: HC$2.00 MF$0.50
Bissett-Berman Corp., Santa Monica, Calif.
FEASIBILITY STUDY OF FAST-SET ELECTROCHEMICAL TIMER.
Final rept.
Jun 66, 33p Rept. no. 330-1
Contract DA-49-186-330 (D)

Descriptors: (*Timing devices, *Electrochemistry), (*Wet cells, Timing devices), Feasibility studies, Performance (Engineering), Electrodes, Electrolytes.

The report covers the work of a feasibility study on a fast-set electrochemical timer. Standard E-CELLs were characterized and found feasible as timers which could be set in 1.5 second for accuracies of plus or minus 5% or plus or minus 1 second over a temperature range of -40 C to +60 C. Diffusion limitations of the cell were explored by testing experimental E-CELLs which had electrolyte concentration changes and electrode texturing changed. Increased electrolyte concentration improves the cell for fast-set applications, but electrode surface roughening is detrimental to accuracy. Recommendations for future work are made. (Author)

AD-637 100 **Field 14B, 3A, 22A**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE ATTACK OF METEORITES.

by B. Konovalov. 8 Apr 66, 9p FTD-TT-65-1049 TT-66-62047
Unedited rough draft trans. from Izvestiya (USSR) 30 Mar p5 1965.

Descriptors: (*Meteorites, *Impact tests), (*Laboratories, *Space environmental conditions), USSR.

Simulated meteorite impact test facilities.

N66-11751 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
National Bureau of Standards, Washington, D. C.
DEVELOPMENT OF IMPROVED METHOD FOR MEASUREMENT OF SPECTRAL IRRADIANCE FROM SOLAR SIMULATORS.
Progress and status rept.
by R. E. Brown, J. K. Jackson, W. E. Schneider, R. Stair, and W. R. Waters. 25 Aug 65, 29p NBS-8960
Contract NASA Order R-116
NASA-CR-68003

Descriptors: *Instrument, *Solar simulator, *Spectral emission.

For abstract, see T 66 18.

N66-14101 **Field 14B**
CFSTI Prices: HC$6.00 MF$1.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
GODDARD SUMMER WORKSHOP PROGRAM - MEASUREMENT AND SIMULATION OF THE SPACE ENVIRONMENT.
Final rept. 15 Jun-15 Sep 64.
by E. Klein. 1964, 288p NASA-TM-X-55168, X-320-64-341

Descriptors: *Optics, *Solar simulation, *Conference, *Environment simulation, *Heat transfer.

N66-14225 **Field 14B**
CFSTI Prices: HC$4.00 MF$0.75
Consolidated Controls Corp., Bethel, Conn.
PRESSURE MEASURING SYSTEMS FOR CLOSED CYCLE LIQUID METAL FACILITIES.
Quarterly rept. no. 6 1 Jun-31 Aug 65.
by A. J. Cassano. 18 Oct 65, 115p
Contract NAS3-4170
NASA-CR-54763

Descriptors: *Liquid metal, *Thermionic diode, *Closed cycle, *Pressure transducer.

N66-16701 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Washington Univ., Seattle. Dept. of Aeronautical Engineering.
EXPERIMENTAL AND THEORETICAL INVESTIGATION OF WIND TUNNEL GEOMETRY, EMPHASIZING FACTORS PERTINENT TO V/STOL VEHICLES TESTING.
Progress rept no. 1, Sep. 16, 64 - Mar 15, 65.
by R. G. Joppa. 1965, 11p
Grant NGr-48-002-010
NASA-CR-70043

Descriptors: *Vertical takeoff and landing /vtol/, *Geometry, *Vtol aircraft, *Wind tunnel.

N66-17086 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Washington Univ., Seattle. Dept. of Aeronautical Engineering.
EXPERIMENTAL AND THEORETICAL INVESTIGATION OF WIND TUNNEL GEOMETRY, EMPHASIZING FACTORS PERTINENT TO V/STOL VEHICLES TESTING.
Progress rept no. 2, Mar 16 - Sep 15 65.
by R. G. Joppa. 15 Jan 66, 26p
Grant NGr-48-002-010
NASA-CR-70331

Descriptors: *Flow field, *Vortex ring, *Wind tunnel apparatus, *V/Stol aircraft.

N66-17097 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Consolidated Systems Corp., Pomona, Calif.
P-107 A HYDROGEN LEAK METER.
Final rept.
Jun 65, 13p
Contract NAS8-5243
NASA-CR-70325

Descriptors: *Flow meter, *Leakage, *Liquid hydrogen, *Mass flow, *Propulsion system, *Measuring apparatus.

N66-17100 **Field 14B**
CFSTI Prices: HC$3.00 MF$0.75
Cryonetics Corp., Burlington, Mass.
DIFFERENTIAL TEMPERATURE CRYOGENIC LIQUID LEVEL SENSING SYSTEM.
Final rept.
by E. D. Mills, and J. A. Oneil. 15 Apr 65, 66p
Contract NAS8-11734
NASA-CR-70317

Descriptors: *Cryogenic fluid, *Differential thermal analyzer, *Liquid level, *Sensor.

N66-17217 **Field 14B**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A VERTICAL TEST RANGE FOR ANTENNA RADIATION MEASUREMENTS.
by W. Korvin, and J. Steckel. 1963, 52p NASA-TM-X-56076

Descriptors: *Radar range, *Satellite-borne radar, *Anechoic chamber, *Antenna field.

N66-17239 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A DIGITIZED SPARK CHAMBER FOR GAMMA RAY ASTRONOMY.
by C. H. Ehrmann. 20 Oct 65, 23p NASA-TM-X-55406, X-611-65-489

Descriptors: *Detector, *Spark chamber, *Astronomy, *Gamma radiation.

N66-17359 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
BIBLIOGRAPHY ON ELECTROMECHANICAL TRANSDUCERS, WITH INDEXES.
Feb 66, 44p NASA-SP-5036

Descriptors: *Abstract, *Bibliography, *Electromechanical device, *Transducer.

N66-17397 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Aircraft Research Association, Ltd., Bedford (England).
GUIDE TO THE A.R.A. 16 IN TIMES 12 IN MACH 4 AND 12 IN DIAMETER MACH 7 BLOWDOWN WIND TUNNELS.
by D. Morton. Oct 65, 21p

Descriptors: *Blowdown wind tunnel, *Compressed air, *Mach number.

N66-17581 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Electro-Optical Systems, Inc., Pasadena, Calif. Transducer Dept.
THE DEVELOPMENT AND FABRICATION OF FOUR LOW PRESSURE TRANSDUCERS (EOS MODEL 6081-1).
Final rept.
by H. Painter. 12 Apr 65, 27p EOS-6081-F
Contract NAS1-4482
NASA-CR-66058

Descriptors: *Pressure probe, *Transducer.

N66-18052 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
College of Aeronautics, Cranfield (England).
ON THE JOULE HEATING METHOD OF CALIBRATING THIN FILM RESISTANCE THERMOMETERS.
by J. R. Busing. May 65, 15p COA-AERO-183

Descriptors: *Film thickness, *Joule heating, *Paint, *Thin film, *Layer, *Platinum, *Resistance thermometer.

N66-18086 **Field 14B**
CFSTI Prices: HC$5.00 MF$1.00
Melpar, Inc., Falls Church, Va. Electronics Research Lab.
DEVELOPMENT OF MONITORING TECHNIQUES BY ACOUSTICAL MEANS FOR MECHANICAL CHECKOUTS.
Final rept. 15 May-30 Sep 65.
by S. J. Campanella, and D. M. Speaker. 30 Nov 65, 151p
Contract NAS8-11976
NASA-CR-70530

Descriptors: *Automatic pattern recognition, *Checkout equipment, *Signature, *Valve.

N66-18463 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
VELOCITY MEASUREMENTS IN THE LANGLEY 1-FOOT (0.305-METER) HYPERSONIC ARC TUNNEL.
by R. J. Duckett, and D. I. Sebacher. Mar 66, 17p NASA-TN-D-3308

Descriptors: *Arc chamber, *Velocity measurement, *Hypersonic wind tunnel.

PB-170 754 **Field 14B**
CFSTI Prices: HC$1.50 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
NAVY CALIBRATION EQUIPMENT LIST, MECHANICAL.
1 Mar 66, 55p NAVWEPS-17-35NCE-2

Descriptors: (*Calibration, Test equipment), (*Test equipment, Calibration), Naval equipment, Catalogs.

The document sets forth those mechanical instruments known to be available to Navy and Marine Corps Calibration Laboratories participating in the Navy Calibration Program.

AD-460 579 **See Field 9C**

AD-636 392 **See Field 1A**

AD-636 409 **See Field 4B**

AD-636 442 **See Field 11F**

AD-636 443 **See Field 8M**

AD-636 446 **See Field 8M**

AD-636 447 **See Field 17H**

AD-636 495 **See Field 20D**

AD-636 608 **See Field 20I**

AD-636 736 **See Field 7D**

AD-636 858 **See Field 7D**

AD-636 927 **See Field 7D**

AD-636 937 See Field 4B

AD-636 941 See Field 13I

AD-636 944 See Field 8A

AD-636 948 See Field 17G

AD-636 951 See Field 8M

AD-636 963 See Field 13D

AD-636 999 See Field 4A

AD-637 074 See Field 13K

AD-637 076 See Field 7D

14D. RELIABILITY

AD-636 578 See Field 18D

AD-636 738 See Field 12A

AD-636 740 See Field 12B

14E. REPROGRAPHY

AD-636 597 Field 14E
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
STRUCTURAL CHARACTERISTICS OF MODERN AERIAL FILMS AND IMAGE SHARPNESS OF AERIAL NEGATIVES.
by V. Ya. Mikhailov. 26 May 66, 42p FTD-HT-66-214
TT-66-61908
Unedited rough draft trans. of Tsentralnyi Nauchno-Issledovatelskii Institut Geodezii, Aerosemki i Kartografii. Trudy (USSR) n149 p70-92 1964.

Descriptors: (*Aerial photography, *Photographic film), Photographic images, Photographic materials, State-of-the-art reviews, USSR, Resolution.

The report examines films produced by Soviet industry with respect to clearness and the physical properties of the developed image.

AD-636 722 Field 14E
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aero Mechanics Dept.
DEVELOPMENT OF A VISCOSE INK FILM TITLER USING SINGLE TITLING HEAD FOR 70MM 5 INCH AND 9 1/2 INCH WIDE ROLL FILM.
Final rept.
by Richard W. Farver. 12 Jul 66, 16p NADC-AM-6635
Task FFRD0001/2021/F001-04-02
See also PB-142 267.

Descriptors: (*Photographic film, Printing), (*Photographic processing equipment, Aerial photographs), Ink, Aerial photographs, Automatic.

This report covers the development of a viscous ink, two line film titler incorporating a motor driven film transport, an illuminated viewing stage and a single titling unit for use with 70MM, 5 inch and 9 1/2 inch wide roll film. (Author)

N66-10587 Field 14E
CFSTI Prices: HC$1.00 MF$0.50
Weapons Research Establishment (Australia). Dept. of Supply.
THE SUPPRESSION OF HARMONIC DISTORTION IN PHOTOGRAPHIC IMAGES.
by R. E. Little. Aug 65, 19p ISD-62

Descriptors: *Distortion, *Photograph, *Sinusoid.

For abstract, see T 66 18.

N66-10731 Field 14E
CFSTI Prices: HC$4.00 MF$1.00
McGill Univ., Montreal (Quebec). Gasdynamics Research Lab.
ON TRANSITION FROM DEFLAGRATION TO DETONATION.
by I. Shanfield. Aug 64, 122p MERL-TN-64
Contract NRC G-1255

Descriptors: *Camera, *Streak photography, *Combustion, *Vessel.

N66-16235 Field 14E
CFSTI Prices: HC$1.00 MF$0.50
Yerkes Observatory, Williams Bay, Wis.
STUDY AND EVALUATION OF ELECTRONOGRAPHY.
Final rept.
by W. A. Hiltner. 30 Jul 64, 23p
Grant NsG-546
NASA-CR-69830

Descriptors: *Photographic emulsion, *Density measurement, *Electron photography.

N66-16243 Field 14E
CFSTI Prices: HC$2.00 MF$0.50
Japan Broadcasting Corp., Tokyo, (Japan). Technical Research Labs.
A STUDY OF FILM CAMERA THREE-COLOR SEPARATION SYSTEM.
by H. Sakata. Sep 65, 34p Labs. note no. S-3

Descriptors: *Television transmission, *Color television, *Light transmission, *Photographic film.

AD-636 295 See Field 3B

AD-636 427 See Field 7D

AD-637 012 See Field 20M

PB-170 952 See Field 5C

15B. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-636 580 See Field 6F

AD-636 881 See Field 6M

15C. DEFENSE

AD-636 845 Field 15C
CFSTI Prices: HC$1.00 MF$0.50
David Taylor Model Basin, Washington, D. C.
A METHOD FOR EVALUATING THE VULNERABILITY OF PARTIALLY DAMAGED WEAPON SYSTEMS TO RE-ATTACK.
Research and development rept.
by Robert Bart. Jul 66, 23p Rept. no. 2206
Proj. S-F013-01-13

Descriptors: (*Weapon systems, *Vulnerability), Damage control, Monte Carlo method, Ships.

An approximate method for assessing the vulnerability of partially damaged weapon systems to re-attack is developed and is based on existing Monte Carlo techniques for evaluating undamaged systems. An illustrative example is presented, and the numerical results are compared with theoretical values derived for the special case of a system divided into five sections having the same probability of being damaged. (Author)

AD-636 440 See Field 13M

AD-636 497 See Field 14A

AD-636 943 See Field 16D

15D. INTELLIGENCE

AD-637 072 Field 15D, 17I
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THEORY OF SCANNING IN MILITARY SCIENCE.
by L. A. Emelyanov, and V. A. Abchuk. 26 Mar 66, 248p FTD-TT-65-1259
TT-66-62043
Unedited rough draft trans. of mono. Teoriya Poiska v Voennom Dele, Moscow, 1964 p1-208.

Descriptors: (*Military intelligence, *Scanning), (*Detection, Military intelligence), Theory, Instrumentation, State-of-the-art reviews.

Methods of scientific analysis pertaining to problems of encounter and discovery of moving targets (ships, aircraft, tanks, etc.) are elucidated in the theory of scanning. The book shows how, on the basis of the theory of scanning, it is possible to obtain practical recommendations for the best means of action in scanning for targets and in evading scanning under various conditions. The book is intended for a wide circle of army and navy officers, as well as students and cadets at institutions of military learning. It will be useful to specialists in civil aviation, in the navy, and in the merchant marine, whose work is connected with scanning for certain movable and stationary targets. The book is based on domestic and foreign open-source materials. (Author)

15E. LOGISTICS

AD-636 376 Field 15E
CFSTI Prices: HC$2.00 MF$0.50
Naval Avionics Facility, Indianapolis, Ind.
INTRODUCTION TO MAINTAINABILITY.
20 Dec 65, 39p NAFI-TP-241

Descriptors: (*Maintainability, Naval research), Maintenance, Design, Logistics, Naval equipment, Air Force equipment, Army equipment, Handbooks.

The publication discusses Maintainability and its history in the Armed Forces, including the need for the Maintainability effort, its influence on the design of hardware, maintenance concepts, prediction and testing, specifications and documents, and new trends and developments.

AD-636 411 Field 15E, 12B
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A MODEL FOR SELECTING, ROUTING AND LOADING AIRCRAFT.
by W. F. Sharpe. Jun 66, 47p RM-4509-PR
Contract AF 49 (638)-1700

Descriptors: (*Operations research, *Air transportation), (*Military requirements, Aircraft), Deployment, Model theory.

This memorandum describes a model for analyzing the problems associated with selecting, routing, and loading military cargo aircraft. Each of these areas has been studied extensively in the past, but no attempt has been made to combine them in a single framework; this memorandum attempts to do so. It first analyzes the routing problem under conditions in which the loading problem can be ignored. Next, it extends the analysis to take account of the loading problem for the more common cases in which it cannot be ignored. Finally, it explores the implications of the model for the selection of aircraft types. (Author)

AD-636 728 Field 15E, 11I
CFSTI Prices: HC$1.00 MF$0.50
Army Natick Labs., Mass. Clothing and Equipment Development Branch.

POLYESTER BATTING FOR CLOTHING AND MITTEN INSULATING LAYERS.
Applications engineering project, Aug-Dec 65.
by Herman Madnick. Feb 66, 16p C/ED-40
USA-NLABS-TR-66-23-CM

Descriptors: (*Polyester plastics, Thermal insulation), (*Gloves, Thermal insulation), (*Clothing, Thermal insulation), Feasibility studies, Arctic regions.

The report describes the feasibility of using a flame-bonded polyester insulating layer to replace a stitch-bonded insulating material for clothing and mitten environmental layers. Substitution of this material would reduce the weight of the end product and lower the ultimate cost to the government because it would require fewer fabrication processes. (Author)

AD-636 955 **Field 15E**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
PROCUREMENT AND MANAGEMENT OF SPARES.
by H. S. Campbell. Jul 66, 39p P-3404
Prepared for publication in a monograph, Defense Management.

Descriptors: (*Spare parts, *Management engineering), Armed forces procurement, Inventory analysis, Inventory control, Stock level control, Replacement theory.

The discussion concerns the rules for deciding which inventory levels are optimal or preferred at the various stockage points in a system. The focus is dictated by the key role played by stockage decisions in a material system. Stockage policy has a pervasive, if implicit, control over the systems operating costs: It determines the level of investment and the frequency of shortages, of requisitions, of new procurements, and of repair actions. The survey is broken down into three parts: (1) a discussion of the main choices in modeling logistics inventory systems and the interpretation of of inventory models and their results; (2) a review of some inventory models representing basic analytic approaches that should have had -- or can be expected to have -- the largest role in application to logistics systems; and (3) a presentation of several special topics of importance to the study of spares management.

AD-636 516 **See Field 12B**

AD-636 554 **See Field 12B**

AD-636 555 **See Field 5I**

AD-636 740 **See Field 12B**

AD-636 947 **See Field 5C**

15F. NUCLEAR WARFARE

AD-636 786 **Field 15F**
CFSTI Prices: HC$2.00 MF$0.50
Naval Applied Science Lab., Brooklyn, N. Y.
IMAGE FURNACE FOR LOW YIELD NUCLEAR WEAPONS EFFECTS SIMULATION.
Progress rept.
by N. Griff, and R. J. Heilferty. 14 Jul 66, 30p
Rept. no. 2
Projs. 9400-105, SF-011-05-11
Task 11292

Descriptors: (*Nuclear weapons, *Thermal radiation), Simulation, Servomechanisms, Carbon, Shutters (Camera).

The capability of the Naval Applied Science Laboratory for direct simulation of thermal effects due to nuclear weapons has been extended to low yield devices (as small as 10 kt) by the installation of a high performance servo-driven shutter in a carbon arc imaging furnace. The system can simulate thermal pulses from weapons with yields of from 10 kt to those from the largest known devices. It can deliver a peak irradiance of 45 cal/sq cm-2/sec over an effective spot diameter (irradiance at least 90% of maximum) of approximately 17mm using a single ellipsoidal mirror. With the addition of a second mirror, a peak irradiance of over 200 cal/sq cm-sec can be obtained with an effective spot diameter of about 4mm. Arbitrary pulse shapes such as square waves and sinusoids can also be delivered. Provision is made to record irradiance histories and source characteristics during each exposure without appreciably interfering with sample irradiation. (Author)

AD-636 766 **See Field 13M**

AD-636 794 **See Field 13L**

AD-636 947 **See Field 5C**

15G. OPERATIONS, STRATEGY, AND TACTICS

AD-636 551 **Field 15G, 12B**
CFSTI Prices: HC$2.00 MF$0.50
Military Academy, West Point, N. Y. Dept. of Electricity.
A BIBLIOGRAPHY OF SEARCH THEORY AND RECONNAISSANCE THEORY LITERATURE.
by Philip H. Enslow Jr. Jun 66, 27p
Pub. in Naval Research Logistics Quarterly v13 n2, NAVSO-P-1278 p177-202 Jun 1966.

Descriptors: (*Bibliographies, *Search theory), (*Aerial reconnaissance, Bibliographies), Game theory, Operations research.

This bibliography consists of 75 items on search theory and reconnaissance theory found in periodicals and technical reports. Each entry includes a short summary or a quotation from the pertinent abstract. The items are classified into one or more of the following categories: (1) General Discussion of Problems; (2) Allocation of Effort; (3) Game Theory Formulations; (4) Geometric Search Patterns; (5) Measures of Performance and (6) Miscellaneous. (Author)

AD-636 601 **Field 15G**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
DETERMINING THE PROBABILITY OF STRIKING AN AERIAL TARGET.
by I. E. Reznik. 2 Mar 66, 10p FTD-TT-66-59
TT-66-61917
Unedited rough draft trans. of Vestnik Protivovozdushnoi Oborony (USSR) n6 p41-4 1965.

Descriptors: (*Aerial targets, *Interception probabilities), Determination, USSR.

For abstract, see T 66 18.

AD-636 453 **See Field 5D**

AD-636 810 **See Field 13B**

AD-636 959 **See Field 5D**

16A. MISSILE LAUNCHING AND GROUND SUPPORT

AD-451 781 **See Field 13**

AD-636 616 **See Field 16D**

AD-636 776 **See Field 5I**

16B. MISSILE TRAJECTORIES

AD-636 616 **See Field 16D**

AD-636 986 **See Field 12A**

16D. MISSILES

AD-636 616 **Field 16D, 22B, 21H, 21K**
CFSTI Prices: HC$8.80 MF$2.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
AN INTRODUCTION TO ROCKETRY.
by V. I. Feodosev, and G. B. Sinyarev. 15 Mar 66, 579p FTD-MT-64-236
TT-66-61924
Edited machine trans. of mono. Vvedenie v Raketnuyu Tekhniku: Izdanie Vtoroe Ispravlennoe i Dopolnennoe, Moscow, 1960 p1-506.

Descriptors: (*Guided missiles, Handbooks), (*Rockets, Handbooks), USSR, Rocket propulsion, Spacecraft, Rocket motors, Rocket propellants, Combustion, Trajectories, Guidance, Ground support equipment, Checkout procedures, Checkout equipment.

Contents: basic relationships in the theory of reaction propulsion; types of rocket vehicles and fundamentals of their construction; rocket engines, their construction and operational features; rocket engine propellants; processes in a rocket engine combustion chamber; flow of combustion products through the nozzle of a rocket engine; flight trajectory of ballistic rockets; basic principles of stabilization, control and guiding of rockets; forces and moments acting on a rocket in flight; ground equipment, rocket and rocket-engine tests.

AD-636 943 **Field 16D, 15C**
CFSTI Prices: HC$4.00 MF$0.75
Naval Postgraduate School, Monterey, Calif.
A COMPUTER SIMULATION FOR THE EVALUATION OF SURFACE-TO-AIR MISSILE SYSTEMS IN A CLEAR ENVIRONMENT.
Technical rept/research paper.
by Alvin F. Andrus. Jun 66, 102p TR/RP-67

Descriptors: (*Guided missile simulators, Computers), (*Guided missiles (Surface-to-Air), Simulators), (*Antiaircraft defense systems, *War games), Kill probabilities, Area coverage, Programming (Computers), Military tactics.

A probabilistic event store computer simulation of the interactions between surface-to-air missile systems and aircraft in a non-jamming environment and over flat terrain is presented. The purpose of the model is to test the general disposition of missile areas and the associated missile system reaction times against an aircraft attack. A complete description of the model with the flow charts and CDC-FORTRAN-60 program listing is included. (Author)

AD-637 070 **Field 16D, 17G**
CFSTI Prices: HC$9.00 MF$2.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THEORY OF REMOTE-CONTROL AND HOMING GUIDANCE SYSTEMS OF ROCKETS.
by V. T. Kochetkov, A. M. Polovko, and V. M. Ponomarev. 11 Feb 66, 602p FTD-MT-64-506
TT-66-62042
Edited machine trans. of mono. Teoriya Sistem Teleupravleniya i Samonavedeniya Raket, Moscow, 1964 p1-536.

Descriptors: (*Guided missiles, Guidance), (*Homing devices, Guided missiles), (*Remote control systems, Guided missiles), Flight control systems, Rocket research, USSR.

CONTENTS: General information on unmanned flight vehicles and their control systems; General characteristics guided rockets; Dynamic properties of guided rockets; Methods of guiding rockets to a target; Analysis of control systems under random influences; Internal control systems (Stabilization systems); Command guidance systems;

Beam-rider guidance systems; Homing guidance system; Reliability of control systems.

17A. ACOUSTIC DETECTION

AD-636 342 **Field 17A, 20A, 20L**
IT Research Inst., Chicago, Ill.
USE OF A POWER-SENSITIVE DETECTOR IN PULSE-ATTENUATION MEASUREMENTS.
by P. D. Southgate. 1966, 4p
AROD-4518:5

Descriptors: (*Acoustic detectors, Piezoelectric crystals), Solid state physics, Acoustics, Attenuation, Measurement.

Identifiers: Acoustoelectric effect.

The use of the acoustoelectric effect in measurements of the decay of multiply reflected acoustic pulses in a specimen is described. The detector is a wafer of piezoelectric semiconductor arranged to absorb a small proportion of each successive pulse. Since the voltage generated is proportional to pulse power and is not sensitive to phase, many types of pulse decay form distortion, which may be associated with such measurements, are eliminated. The efficiency of detection is discussed, and it is shown to be comparable with that of a piezoelectric transducer. (Author)

AD-636 510 **Field 17A**
CFSTI Prices: HC$3.00 MF$0.75
Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
ORTHONORMAL FILTERING APPLIED TO TARGET CLASSIFICATION.
Technical rept.
by Lloyd C. Huff, and Foster H. Middleton. Jun 66, 90p TR-13
Contract Nonr-396 (12)
Projs. NR-185-700, RR-001-03-05

Descriptors: (*Target recognition, *Sonar sound analyzers), (*Wave analyzers, Sonar signals), Filters (Electromagnetic wave), Electroacoustic transducers, Detection, Acoustics, Simulation, Analog computers.

Identifiers: Orthonormal filters.

Orthonormal filters may be used in signal detection schemes to recognize a given input waveform. Based on the ability of orthonormal filters to recognize given waveforms, a target classification scheme is postulated. The mathematical background is developed and the postulate tested for echo waveforms obtained from a prolate spheroid model target. An orthonormal filter is simulated on an analog computer and the echoes, experimentally obtained for each one-half degree of target aspect, are processed. These tests show the orthonormal filter developed does recognize variations between echoes obtained for different target aspects. However, for the echoes processed in this investigation, the orthonormal filter outputs are not slowly varying, single valued functions of target aspect. (Author)

AD-636 583 **Field 17A, 17B**
CFSTI Prices: HC$3.00 MF$0.75
Naval Ordnance Lab., White Oak, Md.
DESIGN OF A SCAN CONVERTER FOR DISPLAY OF SONAR INFORMATION.
Technical rept.
by G. William Meeker. 17 Jun 66, 55p NOLTR-66-118
Task RUXX-00-000/212-1/F008-01-33

Descriptors: (*Sonar signals, *Television display systems), Sonar, Data storage systems, Opticalscanning, Television converters, Storage tubes, Delay circuits, Electron optics.

This paper presents the design of a storage display system for retaining slowly arriving sonar information until a complete picture is received. A scan converter employing the Raytheon CK 1383 electrical-in, electrical-out storage tube converts the stored sonar pictures into standard television format. A bright stored picture is then viewed on a conventional television monitor. Plan Position Indicator (P. P. I.) and B scans are available as well as special purpose scans useful with the CTFM sonar. Erase may be accomplished gradually at a controlled rate, or effected quickly prior to writing a new or succeeding picture. (Author)

AD-451 643 **See Field 20A**

17B. COMMUNICATIONS

AD-636 300 **Field 17B, 9D**
CFSTI Prices: HC$3.00 MF$0.75
Mitre Corp., Bedford, Mass.
HF CHANNEL DATA ERROR STATISTICS DESCRIPTION (I).
by K. Brayer, and O. Cardinale. Jun 66, 65p
MTR-171
Contract AF 19 (628)-5165
Proj. 705B
ESD-TR-66-290

Descriptors: (*Data transmission systems, Errors), (*Statistical analysis, Errors), High frequency, Information theory, Radio communication systems, Voice communication systems.

A statistical description is presented of errors observed on a typical HF data transmission channel. The description includes the probability distribution functions for consecutive errors and error free gaps and their associated cross density statistics. (Author)

AD-636 301 **Field 17B, 17J**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J. Inst for Exploratory Research.
TRANSMITTER ARRAYS IN ACTIVE SEISMIC SYSTEMS FOR COMMUNICATIONS AND SURVEILLANCE.
Technical rept.
by Kurt Ikrath, Wilhelm A. Schneider, and Ronald F. Johnson. Jun 66, 28p
Task 1P0-14501-B31A-00-43
ECOM-2730

Descriptors: (*Transducers, *Seismic waves), (*Information theory, Seismic waves), Underground, Acoustics, Soils, Mechanical waves, Propagation, Communication equipment, Communication systems, Detection.

Identifiers: Seismic communication systems, Seismic detection systems.

Experimental and theoretical data are presented on the performance of seismic wave transmitters consisting of arrays of 80-Hz 10-watt-max resonant seismic transducers. The influence of the structural dimensions of seismic media on the transmission of continuous seismic wave (CSW) signals is analyzed by a comparison of seismic radiation patterns obtained in the field with phase-controlled transducer arrays. Practical applications of phase-controlled seismic transmitter arrays are discussed, and equipments, circuits, and measurement methods are described. (Author)

AD-636 358 **Field 17B, 12B**
CFSTI Prices: HC$2.00 MF$0.50
Human Sciences Research, Inc., McLean, Va.
OPERATIONAL COMMAND/CONTROL OF MILITARY FORCES: BASIC CONCEPTS AND REQUIREMENTS METHODOLOGY.
Final rept., phase I, 10 May-31 Dec 65.
by W. S. Vaughan Jr. and P. Roger Gillette. Dec 65, 40p HSR-RR-65/12-Cd-X
Contract Nonr-4516 (00)
Prepared in cooperation with Stanford Research Inst., Washington, D. C., Contract Nonr-2332 (00), Rept. no. SRI-2167-78-1.

Descriptors: (*Command + control systems, Systems engineering), (*Operations research, Command + control systems), Data processing systems, Decision making, Functional analysis, Military requirements.

This report presents progress made jointly by HSR and SRI during the first phase of a continuing study of the operational command/control function. The objective of the study is to facilitate the activities of system planners by providing a delineation and analysis of the basic functions involved in the exercise of operational command/control, the principles of command/control organization and operations, and a methodology for developing command/control requirements. The work completed during the first phase of the study, and reported here, includes the definition of basic command/control concepts, the formulation of a general description or model of the command/control function, and a preliminary examination of the dependence of function model details upon the operational command level, the type of conflict, and the level of conflict. (Author)

AD-636 592 **Field 17B, 9D**
CFSTI Prices: HC$3.00 MF$0.75
Electro Technical Analysis Corp., Tucson, Ariz.
FREQUENCY ASSIGNMENT STUDIES.
Quarterly progress rept. no. 3, 1 Feb-30 Apr 66.
by A. J. Hoehn, and T. W. McCurnin. Jun 66, 83p
Contract DA-28-043-AMC-01232 (E)
Proj. DA-1E6-20501-D44901
ECOM-01232-3
See also AD-630 562.

Descriptors: (*Radiofrequency, Scheduling), (*Electromagnetic compatibility, Radio communication systems), (*Radio communication systems, Tactical warfare), Frequency, Military requirements, Information theory, Radio transmission, Networks, Mixers (Electronics), Radio receivers, Mathematical models, Graphics.

Identifiers: Frequency allocation.

This is a study to improve electromagnetic compatibility in the field army through development of frequency assignment practices. Further practical aspects of the exclusion and bookkeeping charts involving use of the exclusion template are considered. An improved template is described which reduces by a factor of two the effort required to prepare exclusion charts. A simplified process of recording exclusion data on plastic strips facilitates establishment of the bookkeeping chart and solution of assignment problems. Radio net interference is classified into on-site, adjacent-channel and co-channel problems. The basic framework required for a probabilistic receiver model is discussed. Probabilistic considerations in modeling a single receiver are considered. Several existing receiver modules are examined, and it is found that none of the models gives a true probabilistic picture of receiver action. It is established that two distributions are of importance; a short-term distribution in phase, and a long-term distribution in amplitude of received signals. It is shown that in many cases little realism will be lost if all signals are computed on a completely deterministic basis up to the i-f output. The problem thus is reduced to a probabilistic calculation of the output of an ensemble of signals impressed on a demodulator.

AD-636 603 **Field 17B**
CFSTI Prices: HC$4.00 MF$0.75
Cruft Lab., Harvard Univ., Cambridge, Mass.
ANALYSIS OF A GENERAL CLASS OF PHASE-SHIFT KEYING COMMUNICATION SYSTEMS.
Technical rept.
by J. J. Bussgang, and M. Leiter. Feb 66, 111p
TR-494
Contract Nonr-1866 (16)
Proj. NR-372-012

Descriptors: (*Data transmission systems, *Phase shift), Communication systems, Diversity reception, Analysis.

The objective of this study is to analyze the error performance of phase-shift keying data transmission. The analysis takes as the channel model a random phase-shift, a constant or Rayleigh gain, and additive-white-Gaussian noise. The test statistic for the maximum likelihood receiver with post-detection diversity combining is derived and implementations are obtained. Furthermore, the performance of this receiver is analyzed when the channel model contains additional disturbances (e.g., varying path delay, inter-symbol interference, etc.), although the receiver is no longer optimum. The approach taken in this investigation of m-phase transmission is to derive probabilities involving the choice between two of the m possible transmissions. These probabilities are then related, through geometric arguments, to probabilities involving the choice of one of m transmissions. This technique is useful because probabilities associated with the two-decision problem are relatively easy to compute. (Author)

AD-636 631 **Field 17B**
CFSTI Prices: HC$1.60 MF$0.50
Naval Medical Research Lab., New London, Conn.
PROPOSED SPECIFICATIONS OF RED AND GREEN NAVY SIGNAL LIGHTS.
by Dean Farnsworth. 6 Oct 47, 19p 115, Color Vision-16

Descriptors: (*Signal lights, Specifications), Military requirements, Colors, Naval equipment.

Specifications for signal lights: (a) They must not impose undue manufacturing difficulties. (b) Colors must be distinguishable at small subtense. (c) A compromise must be made between the brightness of a signal light and the purity of the hue. (d) They are influenced by the number of signal lights that will be employed in a given system. (e) Distinction must be made between lights which will be employed for high visibility as opposed to those which must be distinguished unerringly. (f) Certain signal lights will be used with reduced voltages which change the color of the signal.

AD-636 655 **Field 17B, 9F, 9D**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
AUTOMATION (SELECTED ARTICLES).
by Chuan-San Wang, and Han-Yin Chang. 4 Apr 66, 38p FTD-TT-65-1062
TT-66-61943
Edited trans. of Tzu Tung Hua (Chinese People's Republic) v3 n3 p81-94 1960.

Descriptors: (*Remote control systems, Automation), (*Telemetry, *Information theory), Radio communication systems, China.

For abstract, see T 66 18.

AD-636 961 **Field 17B**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE IMPACT OF THE NEW TECHNOLOGY ON COMMAND SYSTEM DESIGN.
by Andrew E. Wessel. Jul 66, 11p P-3409
Prepared for presentation at the Congress on Information System Science and Technology (3rd), Buck Hill Falls, Pennsylvania, Novermber 1966.

Descriptors: (*Command + control systems, State-of-the-art reviews), Real time, Data processing systems, Programming (Computers), Management planning, Systems engineering.

A few years ago S. M. Genensky and author wrote a paper titled, Some Thoughts on Developing Future Command and Control Systems. In brief, the paper argued for a version of an 'on-site' development and design philosophy supported by a military service center which would provide the appropriate specialists on loan to the given user command. This paper raises some questions as to whether the newer capabilities for 'on-line' interactions between users and automated systems have outmoded the previous thinking on the subject of command system design.

AD-636 969 **Field 17B, 20F**
CFSTI Prices: HC$2.00 MF$0.50
Naval Training Device Center, Port Washington, N. Y.
TELEVISION TWO-DIMENSIONAL LIGHT VALVE AND 143-DEGREE WIDE ANGLE LENS.
Final rept., Sep 65-Jun 66.
by George F. Huether. Jul 66, 26p
NAVTRADEVCEN-IH-57
Proj. NTDC-7883-9

Descriptors: (*Television display systems, Optical equipment components), Television equipment, Optics, Training devices, Performance (Engineering).

Identifiers: Eidophor.

This investigation provides conclusions based on a subjective evaluation and observations of a television display of real world, real time images projected on a ten-foot radius hemispherical screen. In the experiment described, an existing one hundred forty-three degree lens designed for the thirty-five millimeter film frame format was coupled to an Eidophor projector and the results evaluated, using a segment of the screen. Test results were generally favorable and indicated that this concept is feasible in applications where clarity of image can be traded off for angle of view. (Author)

N66-10620 **Field 17B**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisburg (So. Australia).
AN UNATTENDED S-BAND RADIO INTERFERENCE MONITOR.
by W. Mettyear. Oct 65, 31p WRE-TN-APD-2

Descriptors: *Deep space instrumentation facility /DSIF/, *Radio frequency monitoring, *S-band, *Space communication.

For abstract, see T 66 18.

N66-10894 **Field 17B**
CFSTI Prices: HC$1.00 MF$0.50
Kokusai Denshin Denwa Co., Ltd., Tokyo (Japan). Research Lab.
PROJECT RELAY I REPORT ON COMMUNICATION EXPERIMENTS CONDUCTED AT KDD EARTH STATION, IBARAKI, JAPAN.
Apr 64, 22p RR-1

Descriptors: *Wideband communication, *Ground station, *Receiving system, *Relay I satellite.

N66-10895 **Field 17B**
CFSTI Prices: HC$1.00 MF$0.50
Kokusai Denshin Denwa Co., Ltd., Tokyo (Japan). Research Lab.
PROJECT RELAY II REPORT ON WIDEBAND COMMUNICATION EXPERIMENTS CONDUCTED AT KDD EARTH STATION, IBARAKI, JAPAN.
Aug 64, 17p RR-6

Descriptors: *Relay II satellite, *Wideband communication.

N66-10896 **Field 17B**
CFSTI Prices: HC$1.00 MF$0.50
Kokusai Denshin Denwa Co., Ltd., Tokyo (Japan). Research Lab.
PROJECT RELAY II REPORT ON NARROWBAND COMMUNICATION EXPERIMENTS CONDUCTED AT KDD EARTH STATION, IBARAKI, JAPAN.
Oct 64, 20p RR-9

Descriptors: *Relay II satellite.

N66-16595 **Field 17B**
CFSTI Price: MF$3.50
National Aeronautics and Space Administration, Washington, D. C.
ELECTROMAGNETIC COMPATIBILITY PRINCIPLES AND PRACTICES.
Oct 65, 708p NASA-TM-X-57183, NHB-5320.3
Available from Superintendent of Documents, GPO, Washington, D.C. 20402, $3.75 HC.

Descriptors: *Apollo project, *Manual, *Electromagnetic compatibility, *Interference.

N66-16918 **Field 17B**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
MERCURY NETWORK ANALYSIS FOR MA-8.
24 Oct 62, 111p NASA-TM-X-55366, X-551-62-192

Descriptors: *Mercury (MA-8), Flight, *Performance characteristics, *Network, *Tracking study.

N66-17234 **Field 17B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
10.6 MICRON COMMUNICATION SYSTEM.
by N. Mcavoy. Nov 65, 26p NASA-TM-X-55396, X-524-65-461

Descriptors: *Communication system, *Deep space, *Laser.

N66-18458 **Field 17B**
CFSTI Price: MF$0.75
National Aeronautics and Space Administration, Washington, D. C.
SIGNIFICANT ACHIEVEMENTS IN SPACE COMMUNICATIONS AND NAVIGATION, 1958-1964.
1966, 73p NASA-SP-93
Available from Superintendent of Documents, GPO, Washington, D. C. 20402 HC$0.45.

Descriptors: *Navigational spacecraft, *Communications satellite, *Space communication.

AD-636 324 **See Field 20L**

AD-636 364 **See Field 5H**

AD-636 399 **See Field 9D**

AD-636 441 **See Field 9E**

AD-636 583 **See Field 17A**

AD-636 587 **See Field 8E**

AD-636 791 **See Field 17C**

AD-636 921 **See Field 9A**

AD-636 933 **See Field 20N**

PB-169 948 **See Field 9E**

17C. DIRECTION FINDING

AD-636 791 **Field 17C, 17B**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Radiolocation Research Lab.
STUDIES IN TIME AVERAGING AND WAVE INTERFERENCE IN RADIO DIRECTION FINDING.
Technical rept.

by E. W. Ernst, M. I. Glick, and E. C. Jones. Jul 66, 29p TR-2, RRL-312
Contract N00014-66-C0010A02

Descriptors: (*Electromagnetic compatibility, Direction finding), (*Direction finding, *Radio equipment), (*Radio interference, Direction finding), Radio interferometers, Digital computers, Radio waves, Propagation.

It is shown that a Watson-Watt direction finder operating under conditions of wave interference will give information allowing a digital bearing computer to determine the directions of arrival of a signal. It is shown that a two-element interferometer operating under conditions of wave interferences can be used with a digital bearing computer operating on one branch of an arc tangent function. This is used to propose a new type of interferometer designed specifically to work with a digital computer. (Author)

AD-636 633 **See Field 5I**

AD-636 637 **See Field 5I**

17G. NAVIGATION AND GUIDANCE

AD-636 612 **Field 17G**
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
DOPPLER SPEED AND DRIFT-ANGLE METERS FOR AIRCRAFT.
by G. K. Dudko, and G. B. Reznikov. 22 Apr 66, 261p FTD-MT-65-105
TT-66-61923
Edited machine trans. of mono. Dopplerovskie Izmeriteli Skorosti I Ugla Snosa Samoleta, Moscow, 1964, p1-344.

Descriptors: (*Aircraft, *Flight instruments), Driftmeters, Doppler effect, Navigational aids, USSR.

In the book are expounded design principles of different Doppler speed and drift-angle meters for aircraft (GSDA) applied in practice, theoretical bases of operation of Doppler meters and peculiarities of construction and operation of separate units of these meters: antennas, UHF channels, Doppler frequency indicators. Furthermore, questions of calibration and adjustment of meters are considered, examples of construction of block diagrams of GSDA are given, and information about complex use of Doppler meters with navigational computers and inertial systems is included. The book is designed for auditors and students of radiotechnical faculties of aviation institutions and can be useful for engineers and technicians occupied with the application of aircraft radio-navigation equipment. (Author)

AD-636 735 **Field 17G, 20D**
CFSTI Prices: HC$1.00 MF$0.50
Woods Hole Oceanographic Institution, Mass.
LIQUID MIRRORS FOR VERTICAL REFERENCE AT SEA.
Technical rept.
by William S. von Arx. Jul 66, 15p WHOI-Ref-66-37
Contract Nonr-2196 (00)
Proj. NR-083-004

Descriptors: (*Horizontal indicators, *Ship auxiliary equipment), Navigational aids, Inertial navigation, Films, Liquids.

Identifiers: Liquid mirrors.

An attempt has been made to produce a viscous liquid mirror with a Newtonian response to ordinary ship accelerations, and to use the device as a level reference surface at sea. (Author)

AD-636 948 **Field 17G, 14B**
CFSTI Prices: HC$3.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Instrumentation Lab.
GYRO TEST STATION CHECKOUT AND EVALUATION.
Technical rept.
by William A. Gianoukos. Apr 66, 53p E-1738
Contract AF 29 (600)-5478
MDC-TR-66-66

Descriptors: (*Gyroscopes, Test equipment), Test methods, Test facilities.

A theoretical discussion of the procedures utilized to check out a gyro test station is presented. An analysis of test results which permits evaluation of the test station is described. The study also includes a brief description of the components involved and the techniques of testing as performed by the Massachusetts Institute of Technology, Instrumentation Laboratory. (Author)

N66-16570 **Field 17G**
CFSTI Prices: HC$7.00 MF$1.75
Westinghouse Electric Corp., Baltimore, Md. Aerospace Div.
STUDY OF BASIC REQUIREMENTS FOR A NAVIGATION, GUIDANCE, AND CONTROL SYSTEM FOR AN UNMANNED LUNAR LANDING VEHICLE.
Final summary rept.
by E. J. Bowers, J. W. Knight, R. L. Taylor, and E. H. Thompson. Dec 65, 329p
Contract NAS8-11254
NASA-CR-61118

Descriptors: *Guidance sensor, *Unmanned spacecraft, *Lunar landing, *Navigation, *Spacecraft sensor.

For abstract, see T 66 18.

N66-18317 **Field 17G**
CFSTI Prices: HC$3.00 MF$0.75
Philco Corp., Palo Alto, Calif. Guidance and Control Engineering Dept.
NAVIGATION AND GUIDANCE ANALYSIS FOR A MARS MISSION.
Interim study rept.
by P. J. Rohde, and S. F. Schmidt. 4 Dec 64, 64p
WDL-TR2359
Contract NAS8-11198
NASA-CR-70635

Descriptors: *Guidance and control, *Position error, *Spacecraft tracking.

PB-169 950 **Field 17G, 1D**
CFSTI Prices: HC$3.00 MF$0.75
National Aviation Facilities Experimental Center, Atlantic City, N. J.
FEASIBILITY TEST OF TELEVISED RADAR.
Final rept.
by Richard L. Sulzer. Jan 66, 79p
Proj. 241-023-01X
SRDS-RD-66-1

Descriptors: (*Radar receivers, Airborne), (*Television communication systems, Surface-to-air), Radar navigation, Civil aviation, Feasjbility systems, Air traffic control systems, Airport radar systems, Microwave relay systems, Flight tests.

Identifiers: Televised-radar navigation systems.

The usefulness to general aviation pilots of ground-to-air relay of airport surveillance radar was tested in VFR weather. TV equipped aircraft flew standard routes in the Boston, Massachusetts, area employing the televised picture for traffic and navigation information, while comparison data runs were flown without the new display. All 14 pilots reported some degree of success in using the televised radar picture, 11 reporting it easy to identify their own blips, 10 stating that radar aided visual search for traffic, and 12 finding that the TV-radar information helped in navigation. Major determinants of success appear to be the quality of the picture and the degree of prior radar familiarization. Records were made of impact upon performance of normal pilot duties. On nine flights the Command Pilot recorded a potential safety factor, apparently related to over concentration on the television. On TV flights about one-half of the subject pilots' time was spent attending to TV, although there was evidence of a learning curve after some practice. It was concluded that televised radar in the cockpit is feasible in concept. (Author)

AD-636 436 **See Field 10B**

AD-636 616 **See Field 16D**

AD-636 635 **See Field 13J**

AD-637 070 **See Field 16D**

PB-169 952 **See Field 1D**

17H. OPTICAL DETECTION

AD-636 447 **Field 17H, 6L, 20F, 14B K**
CFSTI Prices: HC$1.00 MF$0.50
Chiba Univ. (Japan). Dept. of Radiology.
SCAN RECORDING AND RESCAN IN COLOR.
Final rept. no. 2, 17 May 65-16 May 66.
by Hirotake Kakehi. Jun 66, 18p
Contract DA-92-557-FEC-38117
Proj. DA-2N014501B71D
Task 00-033FE
ARDG (FE)-J-250-2

Descriptors: (*Colors, *Optical scanning), Recording systems, Optical equipment, Electronics, Medical equipment, Japan.

Color rescanner is helpful to extract latent information from the original scans which are so scarce in density that they were hardly interpretable. With improvement of the faults of the former color recording system, a new color rescanner was developed. Basic studies and clinical applications were performed with the use of this equipment. As the results, rescanning records of high fidelity were obtained without distortion of the original scan images, and the time required for rescanning was markedly shortened. (Author)

AD-636 325 **See Field 4A**

AD-636 414 **See Field 6P**

AD-636 662 **See Field 11H**

17I. RADAR DETECTION

AD-636 628 **Field 17I, 4B**
CFSTI Prices: HC$1.00 MF$0.50
American Meteorological Society, Boston, Mass.
APPARATUS FOR AUTOMATION OF RADAR OBSERVATIONS.
Research translation.
by I. G. Potemkin. May 66, 9p T-R-516
Contract AF 19 (628)-3880
TT-66-61925
Pristavka dlya Avtomatizatsii Radiolokatsionnykh Nabliudenii, trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR) n57 p67-71 1964.

Descriptors: (*Meteorological radar, Automation), Meteorological parameters, Radar scanning, Photographic recording systems, Servomechanisms, USSR.

An auxiliary device for the ARS-3 weather radar that automates the radar observation and photographic recording of the results is described. A schematic diagram of the control circuit of the antenna and camera and the technical data for same are given. (Author)

AD-636 829 **Field 17I, 9D**
CFSTI Prices: HC$2.00 MF$0.50
Lincoln Lab., Mass. Inst. of Tech., Lexington.
ERROR PROBABILITIES FOR THE DETECTION OF RADAR TARGETS BY MISMATCHED RECEIVERS USING HALF-WAVE NUTH-LAW RECTIFIERS.
Technical note.
by David Middleton. 14 Jul 66, 39p LL-TN-1966-22
Contract AF 19 (628)-5167, ARPA Order-498
ESD-TR-66-363

Descriptors: (*Radar tracking, *Information theory), (*Half-wave rectifiers, Radar receivers), Radar targets, Detection, Errors, Probability, Statistical analysis.

The probabilities of error and successful signal detection are determined for incoherent radar pulse trains observed by a suitably matched or mismatched receiver, which employs a half-wave nuth-law rectifier before video presentation: single targets, normal noise, and incoherent reception are assumed. The effects of detector law, input signal strength, and sample size on performance are examined, and in particular, the modification of performance by mismatch is studied. Mismatch requires, not unexpectedly, a stronger input to achieve performance comparable to that at match. The amount and extent of these modifications are calculated for a variety of examples of interest. In all cases a (relatively) large-sample theory is required for the analysis when comparatively simple results are to be obtained. Exact expressions (all sample sizes) are found, however, in the quadratic case (nu = 2). (Author)

PB-169 609 **Field 17I, 20N, 3A**
CFSTI Prices: HC$1.10 MF$0.50
Kansas Univ., Lawrence. Center for Research.
FREQUENCY DEPENDENCE OF WAVES SCATTERED FROM ROUGH SURFACES.
by Adrian K. Fung. Dec 65, 9p CRES-48-6
Grant NSF-GP-2259

Descriptors: (*Electromagnetic waves, Scattering), (*Radar signals, Scattering), Surface properties, Backscattering, Statistical analysis, Statistical distribution, Frequency, extraterrestrial topography, Radio astronomy.

Statistical parameters of the surface obtained by fitting the average power return curve determined experimentally are shown to be effective parameters rather than the true surface statistical parameters. An expression is obtained relating the wavelength of the incident wave to the effective standard deviation of the surface through estimating the size of the integrand of the integral representing the average return power. It follows that the true value of the standard deviation of the surface is obtained when the incident wavelength is about four times it size. The sampling behavior of the exploring wave is established. It is shown that the explanation offered by Beckmann (Proc. IEEE v53 p1012 1965) using composite surface notion is not in agreement with this result and that the composite surface concept fails to explain experimental results unless the frequency sampling behavior is brought in. (Author)

AD-460 579 **See Field 9C**

AD-636 325 **See Field 4A**

AD-636 441 **See Field 9E**

AD-637 072 **See Field 15D**

17J. SEISMIC DETECTION

AD-636 979 **Field 17J, 8K**
CFSTI Prices: HC$3.00 MF$0.50
IBM Federal Systems Div., Rockville, Md.
LASA SIGNAL PROCESSING, SIMULATION, AND COMMUNICATIONS STUDY. VOLUME I.
Quarterly technical rept. no. 1, Feb-May 66. May 66, 53p
Contract AF 19 (628)-5948, ARPA Order-800
ESD-TR-66-463-Vol-1

Descriptors: (*Seismology, *Data processing systems), Seismic waves, Detection, Seismometers, Simulation, Systems engineering.

Identifiers: LASA.

This rpt sets forth a functional description of a LASA Signal Processing System. The system parameters have been chosen by taking advantage of important system tradeoffs to reduce the hardware necessary to implement the known operating requirements. The system discussed herein is configured to allow considerable experimentation. Generalized processing techniques and system partitioning have been employed to permit growth and change on the basis of experimental results. On the other hand, certain desired operational system functions and performance objectives can at this time be identified. These have been taken into account so that immediate advantage can be taken of existing array equipments and signal processing technology. (Author)

AD-636 980 **Field 17J, 8K**
CFSTI Prices: HC$1.00 MF$0.50
IBM Federal Systems Div., Rockville, Md.
LASA SIGNAL PROCESSING, SIMULATION, AND COMMUNICATIONS STUDY. VOLUME II.
Quarterly process rept. no. 1, Add., Feb-May 66. 27 May 66, 9p
Contract AF 19 (628)-5948, ARPA Order-800
ESD-TR-66-463-Vol-2
See also AD-636 979.

Descriptors: (*Seismology, *Data processing systems), Seismic waves, Detection, Seismometers, Simulation, Systems engineering.

Identifiers: LASA.

The main part of the Quarterly Technical Report is a definition of a signal processing system for LASA suitable for experimental verfication of processing techniques. This addendum summarizes that part of the current and planned effort being carried out in support of that system definition and omitted from the main report. The following tasks will be summarized: System Performance Study, Signal and Noise Simulation, Beam Coverage Analysis, Steering Delay Study, Post Detection and Localization, Display Simulation, Digital Filtering, Analysis of Shear Wave Reception.

AD-637 016 **Field 17J, 8K**
CFSTI Prices: HC$3.00 MF$0.75
Lincoln Lab., Mass. Inst. of Tech., Lexington.
OFF-LINE SIGNAL PROCESSING RESULTS FOR THE LARGE APERTURE SEISMIC ARRAY.
Technical note.
by Jack Capon, Roy J. Greenfield, and Richard T. Lacoss. 11 Jul 66, 64p TN-1966-37
Contract AF 19 (628)-5167, ARPA Order-512
ESD-TR-66-249

Descriptors: (*Seismology, *Data processing systems), Seismic waves, Detection, Seismometers, Integral transforms.

Identifiers: LASA, Vela-Uniform.

The results of a series of off-line signal processing experiments are presented for the experimental Large Aperture Seismic Array (LASA) located in eastern Montana. In particular, the signal-to-noise ratio gains achievable by maximum-likelihood processing, as well as other simpler forms of processing, are given as a function of frequency, aperture, and number of sensors. A partial discussion of the physical characteristics of the noise field which led to these results is also presented. The spurious precursor introduced by one form of signal processing, and shown to be caused primarily by the signal amplitude scatter within a subarray, can be effectively reduced by using amplitude equalization. The signal amplitude scatter within a subarray, and between subarrays, is thus found not to degrade seriously the performance of the signal processing. In fact, the scatter of amplitudes between subarrays, which is significantly larger than that within a subarray, is a definite asset. It was found that the effectiveness of the processing depends not only on the array spatial filtering ability, but on differences in absolute level of the noises in the various sensors. Long-period array data from the extended TFO array were processed and showed roughly square root of N improvement. Our experience in processing a number of events is illustrated by a discussion of the results obtained on two particularly weak events with the maximum-likelihood filter. The apparent magnitude of one event (as averaged over the LASA) was 3.5, and that of the other was 4.0 It was found that the processing was capable of extracting both events from the background noise to the extent that they could be identified as earthquakes and not nuclear explosions. An experiment in suppressing large events that obscure simultaneous smaller events from other source regions is reported. On the basis of these results, several recommendations concerning off-line and on-line processing methods and array geometry are given. (Author)

AD-636 301 **See Field 17B**

AD-637 009 **See Field 8K**

18B. ISOTOPES

NYO-3160-1 **Field 18B, 7E**
CFSTI Prices: HC$3.00 MF$0.50
Tracerlab/Research, Waltham, Mass.
INVESTIGATION OF A NEW TYPE NARROW BAND X-RAY DETECTOR FOR THE IDENTIFICATION OF CHEMICAL ELEMENTS USING RADIOISOTOPE X-RAY SOURCES.
by Joris M. Brinkerhoff, and Richard Forsyth. 10 Dec 65, 50p
Contract AT (30-1)-3160

Descriptors: (*Radioactive isotopes, Chemical compounds), (*Narrowband, X-rays).

For abstract, see T 66 18.

N66-13246 **Field 18B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
CARIBOV, A PROGRAM FOR COMPUTING THE ISOTOPIC COMPOSITION OF NRX URANIUM METAL RODS.
by M. J. Halsall. Aug 65, 30p AECL-2296, CRT-1187-B

Descriptors: *Computer program, *Uranium.

N66-14171 **Field 18B**
CFSTI Prices: HC$3.00 MF$0.75
Laboratoires du Centre d Etude de l Energie Nucleaire, Mol (Belgium).
STUDIES ON THE SEPARATION OF CS 137 AND SR 90 FROM FISSION PRODUCTION IN AN ACID MEDIUM ON MINERAL ION EXCHANGERS.
Final rept.
by L. H. Baetsle, A. Guery, D. Huys, and D. Van Deyck. Aug 65, 77p
Contract EURATOM-028-62-4 RISB
EUR-2497.E

Descriptors: *Strontium 90, *Cesium 137, *Ion exchange.

N66-15840 **Field 18B**
CFSTI Prices: HC$1.00 MF$0.50
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Seibersdorf.
99M TECHNETIUM GENERATOR USING FE2 03 AS SORBENT FOR 99MOLYBDENUM.

by B. Bauer, S. Bubulian, and H. Sorantin. Jun 65, 16p SGAE-CH-18/1965

Descriptors: *Generator, *Iron oxide, *Molybdenum, *Irradiation, *Technetium.

N66-16430 **Field 18B**
CFSTI Prices: HC$2.00 MF$0.50
Oesterreichische Studiengesellschaft Fuer Atomenergie, G.m.b.H., Seibersdorf.
DIGITAL METHODS IN THICKNESS GAUGING. A-THICKNESS GAUGE FOR FAST MOVING DISCONTINUOUS MATERIALS. B-CONTROL DEVICE FOR TUBE WALL THICKNESS.
by W. Attwenger, D. Donhoffer, K. E. Duftschmid, R. Patzelt, and J. Steidl. 1965, 29p SGAE-1B(IA-6)1965
Presented at The Symp. on Radioisotope Instr. in Ind. and Geophys., Warsaw, 18-22 Oct. 1965.

Descriptors: *Tube, *Beta radiation, *Control device, *Digital technique, *Gauge, *Sheet.

AD-636 895 **See Field 6F**

AD-636 896 **See Field 6F**

AD-636 958 **See Field 18L**

CONF-650652 **See Field 7E**

MIT-3343-26 **See Field 6H**

TID-22515 **See Field 6H**

18C. NUCLEAR EXPLOSIONS

AD-636 408 **Field 18C, 19D**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
LABORATORY SIMULATION OF WAVES GENERATED BY UNDERWATER NUCLEAR EXPLOSIONS.
Technical rept.
by J. M. Jordan Jr. Jun 66, 41p TR-R-424
Proj. Y-F008-08-02-128
DASA-14.0831

Descriptors: (*Nuclear explosions, Simulation), (*Underwater explosions, Simulation), (*Water waves, Explosion effects), Detonations.

The kinematics of surface gravity waves produced in water 2.5 feet deep in a basin 90 feet square by a sudden, localized disturbance was studied through measurements of height and period. The waves were generated by the quick withdrawal or immersion, or combinations of these actions, of a 14-foot-diameter half-paraboloid plunger located near the mid-point of one wall of the basin. Smaller plungers of diverse shapes were also used. Measurements were made both in the constant-depth portion of the basin and over a beach with a uniform slope of 1:13.6, which was directly opposite the plunger. At the shoreline about 80 feet from the plunger, waves produced by a sudden withdrawal, for example, were 3 inches high, with a maximum period of 3 seconds. The waves compare adequately with those predicted by the theory of Kranzer and Keller, although they were 40% smaller and 20% shorter. By extrapolation, it was found that waves were produced which adequately simulated those from the actual underwater detonation of a high-energy explosive (5 tons TNT) and a nuclear device (20 kt equivalent). It is concluded that with proper scaling the plunger can be used to simulate waves from such causes. (Author)

AD-636 413 **Field 18C**
CFSTI Prices: HC$14.60 MF$1.00
Naval Ordnance Lab., White Oak, Md.
BLAST AND SHOCK MEASUREMENTS III.
1959, 144p WT-368
Projs. 1-5a, 1-5b
AEC-WT-368
Report on Operation Jangle.

Descriptors: (*Nuclear explosions, Explosion effects), High-speed photography, Shock waves, Blast, Underground explosions, Surface area, Cratering.

Identifiers: Jangle operation.

An attempt was made to measure the transient ground displacement for the surface and underground shots of Operation JANGLE. The method of high speed photography of the ground motion is described. Negative results were obtained for both the surface and underground shots. This method does not appear promising for any future nuclear surface tests. With good photography, this method has considerable promise for underground nuclear explosions and is recommended for future tests. (Author)

AD-636 418 **Field 18C**
CFSTI Prices: HC$4.00 MF$1.00
Malaker Labs., Inc., High Bridge, N. J.
DEBRIS DISTRIBUTION IN UNDERWATER EXPLOSIONS.
Final summary rept.
Sep 65, 124p CM-102-6
Contract Nonr-3095 (00)
Proj. NR-089-020
See also AD-609 039.

Descriptors: (*Underwater explosions, *Explosion effects), Fragmentation, Debris, Nuclear explosions, Explosion bubbles.

For abstract, see T 66 18.

AD-636 729 **Field 18C, 19D**
CFSTI Price: MF$1.00
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
INITIAL EVALUATION OF THE FREE-FIELD RESPONSE OF THE LARGE BLAST LOAD GENERATOR.
Technical rept. Jan 63-Feb 65.
by Thomas E. Kennedy, Gayle E. Albritton, and Robert E. Walker. Jun 66, 164p TR-1-723
Task NWER-13.009

Descriptors: (*Nuclear explosions, *Simulators), (*Blast, Loading (Mechanics)), Performance (Engineering), Soils, Sand, Pressure, Structures, Shock waves, Propagation.

Identifiers: Evaluation.

Tests were conducted in a 23-foot-diameter, nuclear-blast-simulation device in order to calibrate the device and to determine the free-field response of soil specimens loaded dynamically. Two free-field sand specimens, each 10 feet deep, were tested at overpressures ranging from 39 to 450 psi. Twenty-nine tests were made on one specimen and five on the other. Soil tests, conducted both preshot and postshot to determine changes in the physical composition of the specimens, are described. Measurements of blast pressure, free-field pressure, free-field acceleration, and free-field arrival time were made. The results are tabulated. The regions within the specimen affected by the boundaries of the test chamber were approximately defined. (Author)

AD-636 440 **See Field 13M**

AD-636 766 **See Field 13M**

LA-3409 **See Field 18D**

18D. NUCLEAR INSTRUMENTATION

AD-636 578 **Field 18D, 14D**
CFSTI Prices: HC$1.00 MF$0.50
Weston Instruments, Inc., Newark, N. J.
RELIABILITY TEST REPORT ON ROENTGEN RATE METERS PER AGREE.
22 Sep 61, 22p
Contract NObsr-77566
Rept. by Task Group no. 3, Test Level H, Reference Specifications, Proposed Reliability Tests, dated Dec 59.

Descriptors: (*Count-rate meters, Reliability), Performance (Engineering), Life expectancy, Naval equipment.

A reliability determination test of the Roentgen Rate Meter was made to verify the 1000 MTBF target that was established which included 10,000 operations of the scale changing mechanism. In addition, recommendations were to be presented for redesign of the meter to meet the 1000 hours required if test results indicated this necessity. From the data, a MTBF of infinity can be projected since no failures occurred during the 3000 hours of operating time for each of the 7 meters tested. Therefore, no consideration of redesign is necessary and the 1000 hour level for MTBF is considered as acceptable. (Author)

AD-636 780 **Field 18D, 20H**
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Physics.
THE MEASUREMENT OF THE RANGE-ENERGY RELATION AND STRAGGLING OF ALPHA-PARTICLES IN AIR USING A SOLID STATE DETECTOR.
by E. Rotondi, and K. W. Geiger. 7 Sep 65, 5p
NRC-8866

Descriptors: (*Alpha particle detectors, *Semiconductors), Polonium, Alpha particles, Alpha spectra, Radiation measurement systems.

The energy loss of alpha-particles has been studied with a surface barrier detector making use of its much higher resolution than that of ion chambers used in the older work. The range-energy relation has been redetermined with (210)Po alpha-particles. The mean range was found to be 3.835 plus or minus 0.010 cm, which is in agreement with previous work. The semiconductor detector made it possible to measure energy straggling over the whole energy range. The range straggling parameter was derived and good agreement was found with the quantum mechanical theory of straggling which takes into account the effect of electron binding. (Author)

LA-3409 **Field 18D, 18C**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., N. Mex.
PROMPT AIR FLUORESCENCE EXCITED BY HIGH-ALTITUDE NUCLEAR EXPLOSIONS, PHOTOELECTRIC INSTRUMENTATION AND THE HIGH-ALTITUDE FLUORESCENCE (HAF), AND HIGH-ALTITUDE RESONANCE ABSORPTION CALCULATION (HARAC) CODES.
by E. W. Bennett, and R. F. Holland. Sep 65, 76p
Contract W-7405-eng-36

Descriptors: (*Nuclear explosions, High altitude), (*Fluorescence, Nuclear explosions).

For abstract, see N 20 16.

LA-3456 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., N. Mex.
CALCULATION OF THE PULSE-HEIGHT RESPONSE OF GE (LI) SEMICONDUCTOR COUNTERS.
by Edward S. Fry, John M. Palms, and Robert B. Day. 21 Jan 66, 33p
Contract W-7405-eng-36

Descriptors: (*Pulse height analyzers, Counting methods), (*Semiconductors, Pulse height analyzers).

For abstract, see N 20 16.

NAA-SR-11887 **Field 18D, 11F, 18N**
CFSTI Prices: HC$3.00 MF$0.50
Atomics International, Canoga Park, Calif.
ENERGY DEPENDENCE OF NEUTRON AND GAMMA RADIATION DAMAGE IN SILICON.
by M. N. Robinson, N. F. Davies, and S. G. Kimble. 25 May 66, 54p
Contract AT (11-1)-GEN-8

Descriptors: (*Silicon, Radiation damage), (*Nuclear energy, Gamma rays).

For abstract, see N 20 16.

N66-12851 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Atomic energy of Canada, Ltd., Chalk River (Ontario).
A HIGH SENSITIVITY HEAVY WATER LEAK DETECTOR.
by J. G. Bayly. Oct 65, 47p AECL-2291

Descriptors: *Deuterium, *Hydrogen, *Infrared radiation, *Radiation absorption, *Water.

N66-14492 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy Establishment, Winfrith (England). Control and Instrumentation Div.
THE RESULTS OF THE RC10 IONISATION CHAMBER DEVELOPMENT.
by A. Goodings. Mar 65, 13p AEEW-M-508

Descriptors: *Instrumentation, *Ionization chamber, *Reactor.

N66-15841 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Department of Atomic Energy, Bombay (India).
NUCLEAR DATA MEASURING FACILITIES IN INDIA.
1965, 50p AEET-227

Descriptors: *India, *Mass spectrometer, *Oscillator, *Particle accelerator.

N66-16759 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
CONSTRUCTION AND CALIBRATION OF A PROTON RECOIL TYPE NEUTRON SPECTROMETER.
by F. Cappellani, P. F. Cecchi, and A. Fubini. Nov 65, 18p EUR-2491.E

Descriptors: *Fast neutron, *Neutron spectrometry, *Proportional counter, *Spectrometer.

N66-17481 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts General Hospital, Boston. Radiology Dept.
SOLID CHEMICAL RADIATION DOSIMETER.
Annual rept.
by M. S. Potsaid. 20 Dec 65, 34p
Grants NSg-719, NSg-262
NASA-CR-70462

Descriptors: *Dosimetry, *Proton irradiation, *Beta radiation, *Charged particle.

UCRL-16632 **Field 18D**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
DO-IT-YOURSELF LOCK-IN AMPLIFIERS, RADIO AND AUDIO FREQUENCY.
by Kenneth W. Lamers. 14 Jan 66, 71p
Contract W-7405-eng-48

Descriptors: (*Radiofrequency amplifiers, Nuclear physics), (*Audio amplifiers, Nuclear engineering).

For abstract, see N 20 16.

AD-636 530 **See Field 4A**

CONF-650652 **See Field 7E**

CONF-651109 **See Field 6R**

N66-15418 **See Field 18H**

18E. NUCLEAR POWER PLANTS

AD-636 936 **Field 18E, 10A**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
THE CLOSED CYCLE GAS TURBINE FOR NUCLEAR POWER PLANTS.
by C. Keller. Jul 66, 25p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-4A022601A-886
ERDL-T-1859-66, TT-66-62024
Die Geschlossene Gasturbine fur Kernkraftanlagen, trans. from Neue Technik (Switzerland), v7 n4 p153-63 1965.

Descriptors: (*Gas turbines, *Nuclear power plants), Switzerland, Design, Helium, Effectiveness, Economics.

Design and applications of the closed cycle gas turbine combined with high temperature reactors are discussed. Compared with water reactors and steam turbines, the direct cycle gas system - preferably helium - under elevated pressure gives opportunities to reduce the capital costs and to improve the economy due to higher efficiency. With helium as a working medium and the existing state of arts not only small and medium size but also plants up to 250 MW and more can be built. (Author)

AD-636 437 **See Field 18M**

AD-636 920 **See Field 18L**

18F. RADIATION SHIELDING AND PROTECTION

AD-636 788 **Field 18F, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana.
MONTE CARLO CALCULATION OF SELF-SHIELDING BY ENCAPSULATED GAMMA RAY SOURCES.
Final rept. Jun 65-Aug 66 on Nuclear Radiation Shielding Studies.
by Kenneth Preiss. Aug 66, 49p NRSS-3
Contract OCD-OS-63-66

Descriptors: (*Monte Carlo method, *Shielding), (*Gamma rays, Shielding), Photons, Energy, Distribution, Programming (Computers).

The dimensions of many encapsulated gamma ray sources used in experiments are not small compared with the mean-free-path-length of the radiation within them. For this reason, the emitted radiation will not be at the source energies only, but will be distributed in a continuous spectrum. Furthermore, if the source is cylindrical, the emitted radiation will not be isotropically distributed about the source. This report describes a calculation by the Monte Carlo method to find the energy and angular distributions of photons emitted from a cylindrical or spherical encapsulated source. Computed results are compared with experimental observations of energy and angular distribution, and show good agreement. Calculated spectra for typical cylindrical sources of Co-60 encapsulated in iron are given. (Author)

AD-637 125 **Field 18F, 20H**
CFSTI Prices: HC$3.00 MF$0.75
Illinois Univ., Urbana.
EXPOSURE FIELD FROM A POINT ISOTROPIC SOURCE LOCATED AT THE SURFACE OF A THICK CONCRETE SLAB.
Final rept. Jun 64-Aug 66 on Nuclear Radiation Shielding Studies.
by A. B. Chilton, and C. Y. Fu. Jul 66, 64p NRSS-2
Contract OCD-OS-63-66

Descriptors: (*Shielding, *Gamma rays), (*Concrete, Shielding), Cobalt, Cesium, Radioactive isotopes, Albedo, Reactor shielding calculations.

This report gives results of computations for the exposure field from point isotropic sources of Cobalt-60 and Cesium-137 near the surface of a semi-infinite concrete slab. A modification of the Chilton-Huddleston differential albedo formula developed for the vacuum/concrete interface situation is used. To modify the results to include the air effect, computation was made to account for the single-scattered contribution, which is smaller, was estimated approximately from infinite buildup factors in air. The final results, with horizontal source-detector distances out to 50 feet, are presented in comparison with various experimental results. The computational results are estimated to have an uncertainty of about 1%. Agreement with previous work is good in some cases, but under some conditions appreciable discrepancies exist. The preponderance of evidence supports the theoretical results and they are recommended for future use. (Author)

N66-14065 **Field 18F**
CFSTI Prices: HC$3.00 MF$0.75
Lockheed Nuclear Products, Marietta, Ga.
EFFECT OF NUCLEAR RADIATION ON MATERIALS AT CRYOGENIC TEMPERATURES.
by C. A. Schwanbeck. Nov 65, 81p LAC-ER-8231
Contract NAS3-7985
NASA-CR-54787

Descriptors: *Nuclear radiation, *Cryogenic temperature.

For abstract, see T 66 18.

N66-16568 **Field 18F**
CFSTI Prices: HC$3.00 MF$0.75
United Nuclear Corp., Elmsford, N. Y. Research and Engineering Center.
GAMMA SPECTRAL DATA FOR SHIELDING AND HEATING CALCULATIONS.
by J. Celnik, and D. Spielberg. 30 Nov 65, 70p UNC-5140
Contract NAS3-2600
NASA-CR-54794

Descriptors: *Inelastic scattering, *Neutron absorber, *Absorption spectrum, *Radiation spectrum.

CONF-651109 **See Field 6R**

18G. RADIOACTIVE WASTES

N66-15584 **Field 18G**
CFSTI Prices: HC$3.00 MF$0.50
Department of Atomic Energy, Bombay (India).
THE INHOUR RELATION AND EFFECTIVE DELAYED NEUTRON FRACTION FOR MIXED LATTICES.
by M. Srinivasan. 1965, 51p AEET-222

Descriptors: *Fission product, *Lattice, *Neutron emission, *Time function, *Inhour equation.

N66-15870 Field 18G
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
EFFICIENCY OF A SEMICONDUCTOR SANDWICH DETECTOR IN A FLUX OF FISSION NEUTRONS FROM A DISK SOURCE.
by R. A. Rydin. Aug 65, 26p EUR-2487.E

Descriptors: *Fission product, *Neutron detector, *Semiconductor device.

ORNL-3721 Field 18G
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn.
SAFETY ANALYSIS OF RADIONUCLIDE RELEASE TO THE CLINCH RIVER.
Final progress rept. no. 3.
by K. E. Cowser, and W. S. Snyder. May 66, 122p
Contract W-7405-eng-26

Descriptors: (*Reactor safety systems, Radioactive waste), (*Radioactive waste, Disposal).

Identifiers: Clinch River.

For abstract, see N 20 16.

18H. RADIOACTIVITY

N66-10943 Field 18H
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
ATOMIC WAVE FUNCTIONS, COLLISION CROSS-SECTIONS, AND TRANSITION PROBABILITIES OF FE IONS.
by S. J. Czyzak, and T. K. Krueger. 1965, 38p

Descriptors: *Iron, *Atomic gas, *Ionic collision, *Scattering cross section, *Transition probability, *Wave function.

N66-14213 Field 18H
CFSTI Prices: HC$1.00 MF$0.50
Osterreichische Studiengesellschaft fur Atomenergie G.M.B.H., Seibersdorf (Austria).
DETERMINATION OF THERMAL AND RESONANT FISSION PRODUCTS OF CS 136, CS 137, BA 140, RU 103, RU 106 WITH U 233, AND U 235 PROBLEM.
by L. Balcarczyk, P. Keratschev, and E. Lanzel. 1965, 11p SGAE-PH-22/1965

Descriptors: *Cesium, *Rubidium, *Uranium 233, *Barium, *Fission product, *Neutron emission, *Nuclear physics, *Uranium 235.

N66-15418 Field 18H, 18D
CFSTI Prices: HC$2.00 MF$0.50
Atomic Energy Establishment, Bombay (India). Nuclear Physics Div.
NUCLEAR DATA ACTIVITIES IN INDIA. II.
Progress rept.
Jul 65, 44p AEET-228

Descriptors: *Corpuscular radiation, *Nuclear research.

N66-17302 Field 18H
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
ON THE DECAY OF 241 AM-INTENSITY OF CONVERSION ELECTRONS IN 26.4 KE V AND 33.2 KE V PASSAGES IN 237 NP.
by W. Bambynek. Dec 65, 34p EUR-2632.D

Descriptors: *Alpha decay, *Americium 241, *Beta radiation, *Radioactive isotope, *Neptunium, *Radiation intensity.

N66-18045 Field 18H
CFSTI Prices: HC$1.00 MF$0.50
Laboratoire de Physique Theorique et Hautes Energies, Orsay (France).
ON A TEST OF ELECTROMAGNETIC T-VIOLATION IN CHARGED K DECAYS.
by J. L. Gervais, J. Iliopoulos, and J. M. Kaplan. Jan 66, 12p TH/123

Descriptors: *Electromagnetic interaction, *Particle decay, *Charged particle, *Kaon.

AD-476 369 See Field 9A

AD-636 773 See Field 9E

AD-636 957 See Field 7D

SC-CR-66-2010 See Field 6R

18I. REACTOR ENGINEERING AND OPERATION

ANL-7190 Field 18I
CFSTI Prices: HC$6.00 MF$1.25
Argonne National Lab., Ill.
REACTOR ENGINEERING DIVISION ANNUAL REPORT, JULY 1, 1964 TO JUNE 30, 1965.
Mar 66, 207p
Contract W-31-109-eng-38

Descriptors: (*Nuclear engineering, Reports).

For abstract, see N 20 16.

ANL-7204 Field 18I, 18K, 18L, 18M K
CFSTI Pric s: HC$3.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, APRIL 1966.
31 May 66, 95p
Contract W-31-109-eng-38

Descriptors: (*Liquid metal cooled reactors, Reactor fuels), (*Reactor fuels, Fast reactors).

For abstract, see N 20 16.

BNWL-216 Field 18I, 18M
CFSTI Prices: HC$4.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
HEAT TRANSFER EXPERIMENTS FOR THE ADVANCED TEST REACTOR.
by E. D. Waters. May 66, 109p
Contract AT (45-1)-1830

Descriptors: (*Test reactors, Heat transfer).

For abstract, see N 20 16.

IDO-17147 Field 18I
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
NUCLEAR TECHNOLOGY BRANCHES QUARTERLY REPORT, JULY 1-SEPTEMBER 30, 1965.
Apr 66, 44p
Contract AT (10-1)-205

Descriptors: (*Reactor engineering, Reviews).

For abstract, see N 20 16.

N66-10744 Field 18I
CFSTI Prices: HC$1.00 MF$0.50
Instituto De Energia Atomica, Sad Paulo (Brazil).
I. E. A. NEUTRON VELOCITY SELECTOR THEORY AND CALIBRATION.
by M. Abreu, L. Q. Amaral, F. G. Bianchini, and O. W. Martins. Nov 64, 15p IEA-78

Descriptors: *Mechanics /gen/, *Velocity, *Monochromator, *Slow neutron.

N66-16525 Field 18I
CFSTI Prices: HC$7.00 MF$1.75
TRW Systems, Redondo Beach, Calif.
FEASIBILITY STUDY OF DIRECT FLOW GAS CORE REACTOR SYSTEM.
by P. Degarabedian, and H. M. Hunter. 31 Jan 66, 316p STL-4393-6003-RO-000
Contract NASw-1166
NASA-CR-70013

Descriptors: *Gaseous fission reactor, *Nuclear propulsion, *Propulsion system.

N66-17665 Field 18I
CFSTI Prices: HC$3.00 MF$0.75
Aktiebolaget Atomenergi, Stockholm (Sweden).
EXPERIMENTAL STUDIES ON ASSEMBLIES 1 AND 2 OF THE FAST REACTOR FRO, PART 2.
by T. L. Andersson, B. Brunfelter, E. Hellstrand, J. Kockum, and S. O. Londen. Dec 65, 66p AE-207-Pt-2
Prepared in cooperation with Research Inst. of National Defence, Stockholm (Sweden).

Descriptors: *Nuclear reaction, *Fast reactor, *Zero power reactor (ZPR).

SAN-570-2 Field 18I, 18L
CFSTI Prices: HC$7.30 MF$2.00
Planning Research Corp., Los Angeles, Calif.
A PROBABILISTIC METHODOLOGY FOR THE SAFETY ANALYSIS OF NUCLEAR POWER REACTORS, VOLUMES 1 AND 2.
Technical final rept no. 1.
by R. J. Mulvihill. 28 Feb 66, 430p PRC-R-657
Contract AT (04-3)-570

Descriptors: (*Power reactors, Reactor safety systems), (*Reactor safety systems, Probability).

For abstract, see N 20 16.

ANL-6283 See Field 11F

LA-3394 See Field 6R

NYO-187-7 See Field 13A

ORNL-NSIC-12 See Field 13M

ORNL-NSIC-14 See Field 13M

ORNL-NSIC-8 See Field 13M

ORNL-NSIC-9 See Field 13M

18J. REACTOR MATERIALS

ANL-7074 Field 18J, 11F
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
CORRELATION OF THE HEAT TRANSFER PROPERTIES AND ULTRASONIC TRANSMISSION PROPERTIES OF BONDS.
by Roberta Ann Di Novi. Feb 66, 21p
Contract W-31-109-eng-38

Descriptors: (*Heat transfer, Reactor materials), (*Reactor materials, Ultrasonics).

For abstract, see N 20 16.

BMI-1738 Field 18J, 11F, 11B
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING JULY, 1965.
by Russell W. Dayton, and Stan J. Paprocki. 1 Aug 65, 39p
Contract W-7405-eng-92

Descriptors: (*Reactor materials, Nuclear industrial applications), (*Nuclear industrial applications, Reports).

For abstract, see N 20 16.

IDO-14676 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
BURNUP DETERMINATION OF NUCLEAR FUELS.
Project rept for 1 Oct-31 Dec 65.
by William J. Maeck, and Robert M. Abernathey. May 66, 28p
Contract AT (10-1)-205

Descriptors: (*Reactor fuels, Reactor kinetics).

For abstract, see N 20 16.

NAA-SR-11712 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
IRRADIATION PERFORMANCE OF PIQUA CORE I FUEL ELEMENTS.
by J. L. Arnold. 25 May 66, 42p
Contract AT (11-1)-GEN-8

Descriptors: (*Reactor fuel elements, Reactor cores), (*Reactor cores, Radiation damage).

For abstract, see N 20 16.

N66-15885 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
TRANSPORT OF OXYGEN IN OXIDE FILMS ON ZIRCONIUM DETERMINED BY THE NUCLEAR REACTION O17/HE3, ALPHA/O16.
by B. Cox, and C. Roy. Oct 65, 29p AECL-2350
Presented at the Electrochem. Soc. Fall Meeting, Buffalo, Oct 10-14 1965.

Descriptors: *Zirconium, *Oxide film, *Nuclear reaction, *Oxygen atom.

N66-17583 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
TUNGSTEN RESONANCE INTEGRALS AND DOPPLER COEFFICIENTS.
Quarterly rept. no. 2, Oct-Dec 65.
by S. G. Carpenter, J. M. Otter, R. K. Paschall, and H. N. Royden. 11 Feb 66, 30p AI-66-16
Contract NAS3-7982
NASA-CR-54888

Descriptors: *Perturbation theory, *Doppler effect, *Tungsten.

ANL-6283 **See Field 11F**

NAA-SR-11813 **See Field 11F**

18K. REACTOR PHYSICS

AD-636 542 **Field 18K, 18M, 20H**
CFSTI Prices: HC$4.00 MF$0.75
General Dynamics Corp., San Diego, Calif. General Atomic Div.
FAST NEUTRON SPECTRUM OF THE AFRRI TRIGA REACTOR.
Contract rept.
by A. E. Profio, G. B. West, G. K. Houghton, and G. D. Trimble. Jan 66, 109p GA-6465
Contract DA-49-146-XZ-337
AFRRI-CR66-2

Descriptors: (*Reactor operation, Neutron spectrum), (*Neutron spectrum, *Research reactors), Nuclear reactors, Radiation hazards, Fast neutrons, Radiation measurement systems, Neutron flux.

Identifiers: TRIGA reactors.

The angular flux spectrum was measured in a 43 cm sphere filled with the mixture ZrH1.9O0.3Fe0.1A10.05B0.01' representing the approximate homogenized TRIGA reactor core composition (without uranium, and with boron added for thermal neutron absorption). The sphere was reflected with 5.08 cm of water. A 7.6 cm diameter depleted uranium target embedded at the center, excited by a 20 nsec pulsed electron beam for a Linac, was the neutron source for the time-of-flight experiment (50 meter flight distance). Detectors were a 5 by 5 cm liquid scintillator for spectra from 0.4-14 MeV, and a boron capture gamma ray detector for 0.1-0.5 MeV. Measurements were made at 7.6 cm penetration (0 and 51 degrees to the radius vector), at the core-reflector interface, and at the surface of the reflector (0 and 46 degrees). Calculations of the spectrum in the experimental assembly were made with the GAPLSN S sub n code in S8, with 20-group P3 cross sections from the GAM-II code. Comparisons between calculations and experiment were made to decide on the angular mesh, order of anisotropic scattering approximation, energy grouping, and cross sections for a similar calculation of the critical TRIGA reactor spectrum. Results of the calculated cylindrical geometry, P3, S8 angular flux spectrum and total leakage spectrum at the surface of the reflector are tabulated. (Author)

IDO-17169 **Field 18K**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
THE ADVANCED REACTIVITY MEASUREMENT FACILITY II NOISE STUDY.
by L. G. Cloud, R. H. Brown, and N. Wilde. May 66, 28p
Contract AT (10-1)-205

Descriptors: (*Reactor kinetics, Test equipment).

For abstract, see N 20 16.

NAA-SR-11831 **Field 18K, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
THE DTF-II SHIELDING DATA LIBRARY.
by W. B. Green. 25 May 66, 80p
Contract AT (11-1)-GEN-8

Descriptors: (*Reactor theory, Programming (Computers)), (*Neutron transport theory, Reactor shielding calculations).

For abstract, see N 20 16.

N66-11921 **Field 18K**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Cadarache (France). Centre d'Etudes Nucleaires.
UTILISATION OF THE RAPSODIE REACTOR FOR THE MEASUREMENT OF THE DOPPLER EFFECT.
by R. Abdon, J. Ladet, I. Puig, L. Stevens, and C. P. Zaleski. 1965, 43p CEAR-2565
Contract EURATOM-006-61-10 RAAF
EUR-2233.F

Descriptors: *Power reactor, *Doppler effect, *Reactor core.

N66-11922 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
Kernforschungszentrum, Karlsruhe (West Germany).
SUAK-A FAST SUBCRITICAL FACILITY FOR PULSED NEUTRON MEASUREMENTS.
by D. Borgwaldt, M. Kuchle, F. Mitzel, and E. Wattecamps. 1965, 25p KFK-302
Contract EURATOM-009-63-1 RAAD
EUR-2525.E

Descriptors: *Pulsed generator, *Neutron decay, *Reactor.

N66-14263 **Field 18K**
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
KINETIC THEORY AND CALCULATIONS FOR AN ACCELERATOR BOOSTER WITH PERIODICALLY VARYING MULTIPLICATION FACTOR.
by R. Misenta. Aug 65, 44p
EUR-2492.E

Descriptors: *Accelerator, *Kinetic theory, *Periodic oscillation, *Reactor.

N66-15685 **Field 18K**
CFSTI Prices: HC$6.00 MF$1.50
Polish Academy of Sciences, Cracow. Inst. of Nuclear Research.
TABLES OF THE FUNCTIONS X/C1 - NU/ AND X SUPER PLUS OVER SUPER MINUS /C1,C2/ FOR THE NUMERICAL SOLUTION OF SLAB GEOMETRY NEUTRON TRANSPORT PROBLEMS, PART I.
by K. Kowalska, May 65, 268p Rept. no. -630/IX-A/PR, Pt. I

Descriptors: *Geometry, *Neutron, *Problem solving, *Table, *Transport theory.

N66-15940 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
Gesellschaft fuer Kernenergieverwertung, Hamburg (West Germany).
STATIC AND DYNAMIC MEASUREMENTS ON THE DOPPLER EFFECT IN EXPERIMENTAL FAST REACTOR.
by L. Caldarola, K. P. Cohen, W. Hafele, K. Ott, and W. Schikarski. Dec 65, 19p
Contract EURATOM-009-63-1-RAAD
EUR-2484.E
Presented at the Intern. Conf. on the Use of Atomic Energy for Peaceful Purposes (3D), Geneva, Aug 31-Sep 9 1964.

Descriptors: *Doppler effect, *Fast reactor, *Static testing.

N66-16008 **Field 18K, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Reactor Group, United Kingdom Atomic Energy Authority, Sellafield (England).
ODYSSEUS-A TWO-GROUP TWO-DIMENSIONAL FUEL CYCLE COMPUTER PROGRAMME SUITABLE FOR ADVANCED GAS-COOLED REACTORS. PART A-GENERAL DESCRIPTION OF THE PROGRAMME.
by A. N. Buckler. 21 Jun 65, 19p TRG-976 (W)

Descriptors: *Computer program, *Fortran, *Fuel control, *Gas cooled reactor (GCR).

N66-16415 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
IDENTIFICATION CHART FOR GAMMA EMITTING RADIONUCLIDES FORMED BY (N, GAMMA) REACTIONS.
by F. Girardi, G. Guzzi, and J. Pauly. Aug 65, 18p
EUR-2408.E

Descriptors: *Chart, *Emission spectrum, *Identification, *Gamma radiation, *Nuclear reaction, *Thermal neutron.

N66-16498 **Field 18K, 9B**
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
CALCULATION OF MULTIGROUP EXTRAPOLATION LENGTHS AND NEUTRON CAPTURE CYLINDERS SURROUNDED BY PREDOMINANTLY SCATTERING MEDIA WITH THE THRILL PROGRAM.
by C. Ponti, Oct 65, 33p EUR-2536.E

Descriptors: *Computer program, *Control rod, *Fuel element, *Neutron absorber, *Nuclear fuel, *Reactor physics.

N66-16760 Field 18K, 9B
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
A PROGRAME FOR THE SOLUTION OF THE MONOENERGETICAL TRANSPORT EQUATION IN THE P5 APPROXIMATION FOR A MULTIREGION CYLINDRICAL GEOMETRY.
by L. Massimo. Nov 65, 44p EUR-2584.E

Descriptors: *Computer program, *Noneuclidian geometry, *Transport equation.

ANL-7204 See Field 18I

BNL-947 See Field 20H

WASH-1068 See Field 20H

18L. REACTORS (POWER)

AD-636 920 Field 18L, 18E, 13J, 8J K
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
UNDERSEA NUCLEAR POWER - A STATUS REPORT.
Final rept. Jul 64-Dec 65.
by E. J. Beck. Aug 66, 28p TR-R-470
Proj. Y-F015-01-05-005b

Descriptors: (*Nuclear power plants, Ocean bottom), (*Nuclear reactors, Underwater equipment), Marine engineering, Nuclear engineering, Site selection, Oceanology, State-of-the art reviews.

Since the publication in 1964 of Techniques for Underwater Nuclear Power (NCEL TN-545), considerable research and development has been done which has changed the picture regarding the feasibility of using isolated reactors on the ocean bottom. This study considers in some detail the work on fouling, corrosion, and heat transfer accomplished by the C. F. Braun Company, Alhambra, California, under contract NBy-32274 (AD-626 185). Also considered are additional problems which might be encountered in using radioisotope decay heat in large (multi-kilowatt) generators or fuel cells in the deep ocean environment. A cursory up-dating of the known arts related in the earlier study is made, especially in referencing material which has recently become available. Possible areas for further investigation are delineated. (Author)

AD-636 958 Field 18L, 18B, 7E
CFSTI Prices: HC$2.00 MF$0.50
Army Engineer Reactors Group, Ft. Belvoir, Va. Engineering Dept.
SM-1 MAXIMUM PERMISSIBLE CONCENTRATIONS OF RADIOACTIVE ISOTOPES.
Final rept.
by Roy P. Nebiker. 1 Jun 66, 30p ED-6603

Descriptors: (*Pressurized water reactors, Radioactive isotopes), (*Power reactors, Radioactive isotopes), (*Radioactive isotopes, Concentration (Chemistry)), Reactor hazards, Standards, Radioactive decay, Differential equations, Reactor coolants, Air, Radiological contamination, Reactor inspection.

Identifiers: Army reactors (SM-1).

The report discusses the method used in determining maximum permissible concentration of radioactive isotopes as produced by Army nuclear reactors. Accurate current MPC's for use at the SM-1 Nuclear Power Plant at Fort Belvoir, Va., are derived. Final MPC values were determined by applying the Bateman Solution using the Rubinson correction to the general differential equation which is used to describe the decay and activation of a radioactive substance. This solution was applied to specific radionuclides generated in the smallest integral core unit (one fuel plate) after 600 days of reactor operation at full power. When calculations indicated that after complete dissolution of the smallest integral core unit into the primary coolant a significant amount of activity was present, this activity was physically checked for by a complete radiochemical analysis. The calculated values together with the measured radiochemical values were then applied to the 'not present' criteria and the MPC value, in turn, was determined from these results. Isotopes specifically limited to airborne MPC limits were evaluated for by similar calculations, radiochemical analysis of the primary coolant, and by radiochemical analysis of air samples as necessary. (Author)

N66-10557 Field 18L
CFSTI Prices: HC$1.00 MF$0.50
United Kingdom Atomic Energy Authority, Warrington (England). Reactor Group.
BRITISH NUCLEAR POWER DEVELOPMENT WITH GAS-COLLED REACTORS.
by R. V. Moore. 1965, 10p TRG-1047 (R)

Descriptors: *Gas cooled reactor (Gcr), *Great Britain, *Nuclear power.

For abstract, see T 66 18.

N66-10588 Field 18L
CFSTI Prices: HC$5.00 MF$1.25
European Atomic Energy Community, Brussels (Belgium).
T ESI- AND ADVANCED POWER EXCURSION REACTOR FOR RESEARCH IN REACTOR SAFETY, PRELIMINARY STUDIES.
by V. Coen, C. Foggi, S. Galli de Paratesi, F. Lanza, and C. Rinaldini. Jun 65, 191p EUR-2433.E

Descriptors: *Fast reactor, *Neutron flux, *Reactor safety, *Fuel element, *Gamma radiation.

ANL-7204 See Field 18I

SAN-570-2 See Field 18I

18M. REACTORS (NON-POWER)

AD-636 437 Field 18M, 18E
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Ordnance Research Lab.
PARAMETRIC ANALYSIS OF THE NUCLEAR CHARACTERISTICS OF A BOILING WATER VORTEX REACTOR.
Master's thesis (technical memo).
by Alton J. Lipps Jr. 21 Jun 66, 51p
Contract NOw-65-0123-d

Descriptors: (*Boiling water reactors, *Reactor lattice parameters), Physical properties, Reactor theory, Programming (Computers), Nuclear power plants.

Identifiers: Theses.

The effects of physical property changes on the nuclear characteristics of a boiling water vortex reactor have been investigated. The vortex reactor consisted of a central cylinder of steam surrounded by concentric cylindrical annuli of an inner reflector, a core, and an outer reflector. The reactor was fueled with uranium-zirconium hydride, cooled by boiling light water, and reflected by light water. The fuel was considered to be either in fixed rods or plates or in fluidized pellets. The parameter changes were evaluated using three computer codes: the TWENTY GRAND code was used to solve the two-dimensional neutron diffusion equation; the STACS code was used to generate thermal group cross sections; and the FORM code was used to generate fast group cross sections. Two desirable characteristics of the vortex reactor are: the reactor would not depend on gravity for steam separation; and the reactor would be self regulating due to the negative void coefficient. A vortex reactor using fixed fuel elements did not exhibit any large positive reactivity changes due to changes in the geometry and composition, with the exception of a large insertion of positive reactivity, about 6 percent, which occurred when cold water filled the reactor. Since this reactivity can be controlled, a reactor using fixed fuel elements is feasible. The positive reactivity changes possible with a vortex reactor using pellet fuel was much greater than that of the fixed fuel type. The large increases in reactivity possible (as much as 28 percent) caused by lumping of the fuel and changes in the core radii would make such a reactor difficult to control. An acceptable method of prohibiting lumping of the fuel or controlling the high excess reactivities would have to be developed before a pellet fueled reactor of the type considered would be feasible. (Author)

AD-636 542 See Field 18K

ANL-7204 See Field 18I

BNWL-216 See Field 18I

18N. SNAP TECHNOLOGY

N66-15186 Field 18N
CFSTI Prices: HC$4.00 MF$0.75
Aerojet-General Corp., Azusa, Calif.
SNAP-8 MATERIALS REPORT FOR JULY - DECEMBER 1964.
by H. Derow, and B. E. Farwell. Jan 65, 111p
Rept. no. 2989
Contract NAS5-417
NASA-CR-54718

Descriptors: *Coolant, *Reactor material, *Structural material, *System for nuclear auxiliary power-8 (SNAP-8), *Lubricant.

For abstract, see T 66 18.

NAA-SR-11887 See Field 18D

19A. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-637 002 Field 19A, 19B
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., Corona, Calif.
WALLEYE FUZE MK 328 MOD O EXPLOSIVE-TRAIN TESTS.
by Richard L. Higuera, and Rex L. Smith. 25 Jul 66, 33p NOLC-671
Task RM-3773-003/211-1/W120-00-03

Descriptors: (*Bomb fuzes, Guided bombs), (*Explosive trains, Bomb fuzes), Firing tests (Ordnance), Safety.

Identifiers: Walleye, Mark 328 fuzes.

The report describes the tests performed to verify the safety of the Mk 328 Mod 0 Fuze explosive train the safe and commit-to-arm positions and those performed to determine the reliability of the explosive train in the armed position. The safety was verified by firing and analyzing 94 shots using detonators with high outputs, leads with varying sensitivities, and barriers with reduced thicknesses. The reliability was determined by Bruceton analysis of 98 firings in which VARICOMP explosives and methods were used. (Author)

AD-636 934 See Field 4B

19B. BOMBS

AD-637 002 See Field 19A

19D. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-469 918 **Field 19D**
CFSTI Prices: HC$1.60 MF$0.50
Ballistics Research Labs., Aberdeen Proving Ground, Md.
HYPERVELOCITY IMPACT: DEPENDENCE OF CRATER DIMENSIONS ON IMPACT VELOCITY.
Memo. rept.
by John H. Kineke Jr. May 65, 16p BRL-MR-1652
ARPA Order-71
Proj. RDT/E-1P014501A33E

Descriptors: (*Hypervelocity projectiles, Impact shock), (*Impact shock, Cratering), (*Cratering, Velocity), Targets, Copper, Lead, Impact computers, Hydrodynamics, Projectiles, Aluminum, Steel, Titanium.

Craters in copper and lead, produced by hypervelocity impact, have been measured and the dimensions correlated with impact velocity. The results indicate that craters scale with about the 1.7 power of velocity, in agreement with computer physics results based upon hydrodynamic calculations. (Author)

AD-636 996 **Field 19D**
CFSTI Prices: HC$1.00 MF$0.50
Underwater Systems, Inc., Silver Spring, Md.
CHASE VII SOURCE DATA.
Technical progress rept. no. 12.
by Marvin S. Weinstein. 10 Aug 66, 10p
Contract Nonr-4026 (00), ARPA Order-218
Proj. RR004-08-01
See also AD-636 996.

Descriptors: (*Underwater explosions, Experimental data), Depth finding, Position finding, Time, Intensity.

Source data for CHASE VII is presented. This includes explosive yield (400 tons), shot depth, shot location, shot instant. (Author)

AD-636 408 **See Field 18C**

AD-636 729 **See Field 18C**

19G. ROCKETS

N66-14173 **Field 19G**
CFSTI Prices: HC$3.00 MF$0.75
National Research Council of Canada, Ottawa (Ontario). Radio and Electrical Engineering Div.
SOUNDING ROCKET LAUNCHINGS AT CHURCHILL RESEARCH RANGE, SEPTEMBER 1964 ROCKET AD- II-58 AND AK- II-59.
by F. V. Cairns, and K. A. Steele. Mar 65, 62p ERB-701

Descriptors: *Engineering, *Sounding rocket.

For abstract, see T 66 18.

20. PHYSICS

AD-637 118 **See Field 20D**

20A. ACOUSTICS

AD-451 643 **Field 20A, 17A**
CFSTI Price: HC$12.60
Navy Underwater Sound Lab., New London, Conn.
UNDERWATER REVERBERATION AS A FACTOR IN ASW ACOUSTICS.
by Peter A. Barakos. 11 Sep 64, 121p Rept. no. 620

Descriptors: (*Underwater sound, *Symposia), Vibration, Antisubmarine warfare, Scattering, Ocean bottom, Sonar receivers, Propagation, Frequency, Bibliographies, Great Britain, Canada, United States.

The report is a presentation of the discussion at a four-day seminar (21-24 September 1961) at the Naval Research Establishment, Dartmouth, N. S., in which all the aspects of reverberation were discussed. Experts on reverberation from the United States, the United Kingdom, and Canada attended the meeting. The report is intended to form a guiding basis for future work in reverberation. Specific points which are thought to be of basic importance in the understanding of reverberation such as the mechanisms and statistical nature of reverberation are elucidated. The purpose of the report is to present the latest evaluation of knowledge of reverberation.

AD-636 531 **Field 20A**
CFSTI Prices: HC$3.00 MF$0.50
State Univ. of New York, Buffalo. Div. of Interdisciplinary Studies and Research.
DIFFRACTION OF PULSES BY OBSTACLES OF ARBITRARY SHAPE WITH A ROBIN BOUNDARY CONDITION. PART A. SEMI-RIGID CASE.
Summary rept.
by Richard P. Shaw. 1966, 56p Rept. no. 10
Contract Nonr-4449 (00)

Descriptors: (*Sound, *Diffraction), (*Boundary value problems, Diffraction), Integral equations, Differential equations.

The potential field and its derivatives (pressure and velocity) resulting from the diffraction of a plane acoustic pulse by an obstacle of arbitrary shape with a Robin boundary condition, is obtained as the solution to an integro-differential equation. The specific geometry of a long cylinder with a square cross section struck longitudinally by a plane pulse is solved for values of the pressure on the scattering surface for the semi-rigid case $K > 1$. A major portion of the solution is obtained exactly. The remainder involves a numerical approximation of a surface integral by a double summation over specified steps in space and time leading to a weakly coupled set of simultaneous equations at eact time step. Comparison with available exact solutions indicates good agreement. (Author)

AD-636 532 **Field 20A**
CFSTI Prices: HC$2.00 MF$0.50
State Univ. of New York, Buffalo. Div. of Interdisciplinary Studies and Research.
DIFFRACTION OF PULSES BY OBSTACLES OF ARBITRARY SHAPE WITH A ROBIN BOUNDARY CONDITION. PART B. SEMI-FREE CASE.
Technical rept.
by Richard P. Shaw. Apr 66, 43p Rept. no. 12
Contract Nonr-4449 (00)

Descriptors: (*Sound, *Diffraction), (*Boundary value problems, Diffraction), Integral equations, Differential equations, Potential theory.

The velocity field resulting from the diffraction of a plane acoustic wave by a scattering obstacle of arbitrary shape with a Robin boundary condition, is found as the solution to an integro-differential equation. Numerical values are found for the velocity on the surface of a long cylinder of square cross section struck longitudinally by a plane pulse through an approximation of the integral by finite summations over specified steps in space and time. Comparison with exact solutions available for certain regions of space-time indicate good agreement. The solution for small values of K does not differ greatly from that for $K = 0$ indicating that the free boundary condition is a reasonable approximation for many physical problems. Values of K up to 1.0 (in appropriate nondimensional form) seem to give most reasonable rsults in terms of velocity; for $K > 10$ a formulation in terms of pressure seems more appropriate and for values $1 > K > 10$ either form will do. (Author)

AD-636 805 **Field 20A, 20D**
CFSTI Prices: HC$6.00 MF$1.25
General Electric Co., Cincinnati, Ohio. Advanced Engines and Technology Dept.
RESEARCH ON JET NOISE GENERATION AND SUPPRESSION.
Final rept., phase 1.
by W. R. Semrau. Apr 64, 249p
Contract NOw-62-0887-d
See also AD-432 086.

Descriptors: (*Jet engine noise, Scientific research), (*Acoustics, Jet engine noise), Naval research, Jet plane noise, Nozzle gas flow, Mathematical analysis, Fluid mechanics.

Experimental and analytical investigations on jet noise generation and suppression have resulted in a verification of the concept that jet noise is uniquely related to mean flow velocity distribution in the jet wake. Advances have been made in analytical techniques for calculating aerodynamic properties of free jet flow and the related acoustic properties of the flow and verification of the assumption that negligible attenuation of sound occurs during propagation through multi-element jet flows has been achieved. Investigation of selective water injection as a jet noise suppression scheme has indicated little promise for in-flight noise reduction. Studies of noise generation by high temperature and high pressure ratio jets have extended the state-of-the-art in the area of high temperature flow noise suppression, and have resulted in a means for predicting total acoustic power beyond the limits of applicability of the Lighthill parameter. (Author)

AD-636 923 **Field 20A, 13J, 8J**
CFSTI Prices: HC$1.00 MF$0.50
Scripps Institution of Oceanography, San Diego, Calif. Marine Physical Lab.
FLIP ACOUSTICAL SELF-NOISE.
Summary rept.
by Earl D. Squier. 1 Jul 66, 11p SIO-Ref-66-12, MPL-U-29/66
Contract Nonr-2216 (05)

Descriptors: (*Noise, Oceanographic vessels), (*Buoys, *Oceanographic vessels), (*Acoustics, Underwater sound), Marine geophysics, Instrumentation, Background, Audiofrequency, Extremely low frequency, Very low frequency.

Identifiers: FLIP oceanographic vessel.

An analysis of the acoustical self-noise of the Floating Instrument Platform R/P FLIP is presented. The noise background experienced in the frequency range of 1.4 cps to 20 kc is given for several operating and sea conditions. (Author)

N66-15873 **Field 20A**
CFSTI Prices: HC$4.00 MF$0.75
European Organization for Nuclear Research, Geneva (Switzerland). Nuclear Physics Div.
A SONIC SPARK CHAMBER SYSTEM.
by G. Bellettini, G. Cocconi, A. N. Diddens, R. Donnet, and M. Ferrat. 25 Oct 65, 113p CERN-65-33

Descriptors: *Spark chamber, *Proton scattering.

For abstract, see T 66 18.

AD-636 342 **See Field 17A**

AD-636 492 **See Field 8K**

AD-636 602 **See Field 20L**

AD-636 945 **See Field 21G**

AD-637 035 **See Field 7D**

20B. CRYSTALLOGRAPHY

AD-636 339 **Field 20B**
Melpar, Inc., Falls Church, Va.
STRUCTURE, GROWTH, AND PROPERTIES OF TWIST AND TILT GRAIN BOUNDARIES IN BICRYSTALS OF NaCl.
by N. Fuschillo, M. L. Gimpl, and A. D. McMaster. 5 Feb 65, 9p
AROD-5727:2

Descriptors: (*Grain boundaries, Crystals), (*Sodium compounds, Chlorides), Crystal growth, Surface properties, Crystal structure, Crystal lattice defects, Mechanical properties.

Identifiers: Sodium chloride, Czochralski growth.

Grain boundaries having from 2 degrees to 45 degrees mismatch across the interface were grown for pure tilt and pure twist misorientation in NaCl by the Czochralski technique. The method of crystal growth and the techniques required for good control of the misorientation and the planarity of the grain boundary are described. The substructure of twist and tilt NaCl bicrystals was examined using both optical and electron-microscopic techniques. The tilt grain boundaries were found to be strong mechanically and not easily cleaved apart. The twist grain boundaries were very weak mechanically, especially at mismatch angles greater than 20 degrees, and exhibited anomalously rapid diffusion or capillary flow effects along the grain boundary. Grain boundaries in the bicrystals were examined by: (1) pulling the crystals apart at the grain boundary and (2) by polishing away one side of the bicrystal to within 0.5 mm of the grain boundary. (The grain boundary surface could then be examined by focusing through the layer of NaCl.) Both of these techniques showed that the twist bicrystals were held together by small regions or spots of continuity at the grain boundary. The spot density ranged from 500/sq cm to 20 000/sq cm for 45 degrees and 10 degrees twist bicrystals, respectively. No substructure was observed for tilt grain boundaries. This may explain not only the extreme mechanical weakness of twist grain boundaries, but may also help to explain brittle fracture in polycrystalline ionically bonded solids generally, including ceramics and other alkali halides, and phenomena, such as the solution embrittlement of AgCl. (Author)

AD-636 363 **Field 20B**
Lincoln Lab., Mass. Inst. of Tech., Lexington.
FOUR-PROBE DEVICE FOR ACCURATE MEASUREMENT OF TEMPERATURE DEPENDENCE OF ELECTRICAL RESISTIVITY ON SMALL, IRREGULARLY SHAPED SINGLE CRYSTALS WITH PARALLEL SIDES.
by R. W. Germann, and D. B. Rogers. 4 Oct 65, 3p JA-2667
Contract AF 19 (628)-5167
ESD-TR-66-187

Descriptors: (*Probes, Single crystals), (*Single crystals, *Resistance (Electrical)), Test equipment, Crystal structure, Crystal holders, Measurement, Electrical conductance, Temperature.

A sample holder is described that considerably facilitates the measurement of specific resistivity on small, irregularly shaped single crystals over a large range of temperature. Utilizing the van der Pauw technique, accurate values of this electrical transport parameter were obtained without loss of contact at temperatures as low as 4.2K. The essential advantage of this holder is its simplicity which eliminates the necessity of specialized techniques for accurate measurements on irregular crystals as small as 1 mm. (Author)

AD-636 486 **Field 20B**
Carnegie Inst. of Tech., Pittsburgh, Pa. Dept. of Metallurgical Engineering.
OBSERVATION BY OPTICAL INTERFEROMETRY OF DEFORMATION TWINNING IN SILVER AND COPPER.
Revised ed.
by K. J. Davis, and H. Mykura. 6 Oct 65, 7p
Contract Nonr-760 (08)
Proj. NR-031-184
Revision of manuscript submitted 26 Jul 65.

Descriptors: (*Silver, Twinning (Crystallography)), (*Copper, Twinning (Crystallography)), (*Twinning (Crystallography), Deformation), Interometers, Microscopy.

The results show tolerable agreement between the expected and measured components of shear and are therefore consistent with the generally accepted twinning in f.c.c. metals. As there were two sets of twins on the silver crystal, the orientation of two planes was known and therefore the specimen could be completely oriented from the optical data. X-ray back-reflection (Laue) photographs confirmed the crystal and twin orientations found optically, and a complete X-ray orientation of the twins was also possible.

AD-636 341 **See Field 20L**

AD-636 487 **See Field 11F**

AD-636 520 **See Field 20L**

AD-636 544 **See Field 7D**

AD-637 036 **See Field 20L**

AD-637 078 **See Field 11B**

20C. ELECTRICITY AND MAGNETISM

AD-636 377 **Field 20C, 20N**
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
EFFECTIVE DIELECTRIC CONSTANT, PERMEABILITY AND CONDUCTIVITY OF A RANDOM MEDIUM AND THE VELOCITY AND ATTENUATION COEFFICIENT OF COHERENT WAVES.
Research rept.
by Joseph B. Keller, and Frank C. Karal Jr. 23 Jul 65, 15p EM-208
Contract AF 19 (628)-3868
Proj. AF-5635
Task 563501
AFCRL-65-643

Descriptors: (*Electromagnetism, Propagation), Mathematical analysis, Dielectric properties, Magnetic permeability, Attenuation.

Random media are considered in which the dielectric constant, permeability, and conductivity are random functions of position. For them, the average electric field, electric current, dielectric displacement, magnetic field, and magnetic induction are determined, assuming that these average quantities are time-harmonic plane waves. The proportionality factors between appropriate pairs of these quantities are found and defined to be the effective dielectric constant, permeability, and conductivity of the random medium. These effective parameters depend upon the frequency and propagation constant of the field in addition to the two-point auto- and cross-correlation functions of the random dielectric constant, permeability, and conductivity. For transverse fields they are all scalars. In addition the dispersion equation for the propagation constant of the average of coherent field, derived previously, is analyzed and solved for high- and low-frequency fields. From the propagation constant, the phase velocity and attenuation coefficient can be found. (Author)

AD-636 388 **Field 20C, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Santa Clara Univ., Calif. Dept. of Physics.
PARAMAGNETISM OF CARBAZYL AND HYDRAZYL RADICALS.
Final rept.
by W. Duffy Jr, and D. L. Strandburg. 1966, 27p
Grant Nonr (G)-00058-63
Proj. NR-018-206

Descriptors: (*Free radicals, *Paramagnetism), (*Organic nitrogen compounds, Magnetic properties), Aromatic compounds, Cryogenics, Crystals, Antiferromagnetism, Integrals.

Identifiers: Magnetic susceptibility, Carbazyl radicals, Hydrazyl radicals.

Static magnetic susceptibility measurements in the temperature range 1.4-300K are reported on powder samples of the stable aromatic free radicals Picryl-n-aminocarbazyl (PAC), 2,2-Diphenyl-1-picryl-hydrazyl in the 106C m.p. (DPPH I) and 137C m.p. (DPPH II) crystal modifications, 2 - Phenyl - 2 - p - nitrophenyl - 1 - picrylhydrazyl ($DHNO_2$) and 2,2-Bis-p-nitrophenyl-1-picrylhydrazyl ($D(NO_2)_2$). Radical concentrations in the range from 0.81 to 0.99 and Weiss constants in the range -36K to -5.2K were determined. The measurements were interpreted assuming that the magnetic behavior is due to alternating antiferromagnetic exchange-coupled linear chains. Exchange integrals were inferred from fitting theoretical curves to the susceptibility maxima. Evidence is presented for the presence of random dilution by diamagnetic sites in PAC. (Author)

AD-636 560 **Field 20C, 10B, 9A**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
EFFECT OF THERMAL AND ULTRAVIOLET RADIATION ON THERMIONIC EMISSION FROM TUNGSTEN.
by R. E. Stickney, P. B. Sun, and M. L. Shaw. 29 Nov 65, 5p
Contract DA-36-039-AMC-03200 (E)

Descriptors: (*Tungsten, *Thermionic emission), Cathodes (Electron tubes), Diodes (Electron tubes), Thermal radiation, Ultraviolet radiation, Photoelectric effect, Thermionic converters.

When thermal or ultraviolet radiation is focused upon a thermionic cathode, the resulting elevation of the cathode temperature causes the thermionic emission current to increase. Hence a thermionic diode may be used to measure radiation intensity, and it provides a convenient technique for measuring the spectral emissivities of materials at high temperatures. Also thermionic diodes may provide new techniques for detecting molecular beams and for studying chemical reactions at surfaces. Reported here are experimental data on the effect of thermal and ultraviolet radiation on the electron emission from a tungsten cathode. At high cathode temperatures, the increase in thermionic emission produced by ultraviolet radiation is much larger than the photoelectric emission. The results are described by a simple expression derived from the Richardson equation for thermionic emission. (Author)

AD-636 564 **Field 20C, 20I, 20M**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
THERMODYNAMICS AND FORCE OF ELECTROMAGNETIC ORIGIN.
by Paul Penfield Jr. 1966, 3p
Contract DA-36-039-AMC-03200 (E)

Descriptors: (*Magnetohydrodynamics, Field theory), (*Electromagnetism, Field theory), Thermodynamics, Force (Mechanics), Mathematical analysis.

An expression for force in a simple magnetizable fluid is given. This is derived, by a method that is described, from thermodynamic information about the energy and power. The force is expressed in the Chu, Amperian, and Minkowski formulations of electrodynamics. (Author)

AD-636 581 **Field 20C, 20I**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
RADIATION FROM ELECTROMAGNETIC SOURCES IN AN UNBOUNDED COMPRESSIBLE MAGNETO-PLASMA.
by H. Unz. Sep 65, 26p P-3224
Prepared in cooperation with Kansas Univ., Lawrence. Dept. of Electrical Engineering.

Descriptors: (*Electromagnetism, *Magnetohydrodynamics), Electromagnetic waves, Propagation, Compressible flow, Plasma physics, Wave functions, Integral transforms, Green's function.

The radiation fields from electric and magnetic current density sources, arbitrarily distributed in unbounded compressible plasma with arbitrarily directed static magnetic field, are evaluated by using Fourier integral transform. The final results are expressed in terms of dyadic Green's functions. (Author)

AD-636 598 **Field 20C, 20H**
CFSTI Prices: HC$4.00 MF$0.75
Illinois Univ., Urbana. Coordinated Science Lab.
A STUDY AT HIGH ENERGY-RESOLUTION AND AT LOW PRIMARY ENERGIES OF THE SECONDARY ELECTRON EMISSION FROM (100) TUNGSTEN.
by Thomas C. Piper. Jul 66, 120p R-304
Contract DA-28-043-AMC-00073 (E)
Proj. DA-20014501B31F

Descriptors: (*Tungsten, *Secondary emission), (*Electron beams, Secondary emission), Elastic scattering, Inelastic scattering, Band theory of solids, Vacuum, Complex compounds, Excitation, Phonons, Spectrum (Infrared), Instrumentation.

An apparatus was designed and constructed to study secondary electron emission at low primary energies (0-50 eV). Secondary energy distribution and elastic-and-inelastic reflection data are presented for primary electrons incident on both clean and gas-covered (100) tungsten. Structure in the elastic and inelastic reflection data are found to be associated with the band structure of the target. Discrete energy loss structure due to the excitation of vibrational levels of gas complexes adsorbed on the target is found in the region just beneath the elastic peak for primary energies between 1.0 and 10.0 eV. Various adsorbed gases are found to give rise to different spectra of discrete energy losses. The constant shape and location of the energy distribution of the elastic peak over the primary energy range 3.0 to 70.0 eV shows that shifting or broadening of the peak due to phonon excitation must be less than 10 meV over this entire energy range.

AD-636 649 **Field 20C, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THERMALLY PRODUCED NON-MONOTONIC CURRENT-VOLTAGE CHARACTERISTICS.
by E. Nebauer, and E. Jahne. 23 May 66, 23p
FTD-TT-65-1749
TT-66-61938
Edited trans. of Physica Status Solidi (Germany) v8 n3 p881-96 1965.

Descriptors: (*Solid state physics, *Thermoelectricity), Semiconductors, Photoelectric materials, Electric insulation, Electrical properties.

Negative differential resistance in certain regions of the steady-state current (I) - voltage (V) characteristics of semiconductors, photoconductors and insulators is discussed.

AD-636 706 **Field 20C**
Columbia Univ., New York. Inst. for the Study of Fatigue and Reliability.
EFFECT OF ELECTRON-DAMPED DISLOCATIONS ON THE DETERMINATION OF THE SUPERCONDUCTING ENERGY GAPS OF METALS.
Technical rept.
by Warren P. Mason. 9 Aug 65, 13p TR-32
Contract Nonr-266 (91)
Proj. NR-064-470
Prepared in cooperation with Bell Telephone Labs., Murray Hill, N. J.

Descriptors: (*Superconductors, Crystal lattice defects), Superconductivity, Metals, Band theory of solids, Damping, Electrons.

When account is taken of the damping of dislocations by electrons- i.e., by electron viscosity- it is shown that the energy losses due to this source are appreciable and are different in the normal and in the superconducting states. By subtracting off these two losses for the acoustic attenuation measured for these two states, and using the relation between the residual attenuations for the two states determined from the BCS theory, a much better determination of the energy gaps for superconductors is obtained. For lead the value is 2 epsilon sub o= (4.1 plus or minus 0.1)kT sub c, in good agreement with other methods for measuring the gap. The electron damping of dislocations accounts also for the amplitude effect in the superconducting range first observed by Love and Shaw. Theoretical calculations by Tsuneto have indicated that the ratio of the attenuation in the superconducting to that in the normal state for longitudinal waves should be the same for the region q1<<1 as that which has been found by BCS in the region q1>>1. When account is taken of the dislocation damping effect, it is shown that existing data confirm this calculation. (Author)

AD-636 804 **Field 20C, 20D, 20I**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missiles and Space Div.
ELECTRIC ARCS IN TURBULENT FLOWS, II.
by Gerhard Frind. Apr 66, 50p
Contract AF 33 (657)-8206
Proj. AF-7063
ARL-66-0073
See also AD-608 938.

Descriptors: (*Turbulence, *Electric arcs), (*Heat transfer, Gas flow), Argon, Electrical properties, Photographs, Plasma medium.

Turbulent heat transfer in axial flow electrical arcs was experimentally studied. The arcs were operated with argon in the current range of 10 to 100 amps, with pressures of 1 to 10 atm., and with flow rates of 0.02 to 35 grams/sec. The flow tubes employed were 75 cm long and had inner diameters of 0.5 and 1.0 cm. It was found that the arc potential increased linearly along most of the tube length for all flow rates. Also, calorimetric measurements at the end of a flow tube with 0.5 cm diameter showed close agreement between wall heat flux and electrical input per cm for all flow rates. This, together with a careful estimate of the remaining flow terms, showed that a fully developed temperature profile was achieved. The arcs at high flow rates showed considerably larger electrical gradients than the arcs at low flow rates. In addition to this, high speed photographs revealed that increased electrical gradients were accompanied by the onset of disturbances of the plasma column. At conditions of the highest flow rates and electrical gradients achieved, the arcs appeared to be strongly turbulent, with the arc column "broken up" into plasma globules of irregular shapes and sizes. (Author)

AD-637 037 **Field 20C**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
MODEL FOR FORCE DENSITY IN MOVING MAGNETIZED MATERIAL.
by Hermann A. Haus. 1966, 3p
Contract DA-36-039-AMC-03200 (E)

Descriptors: (*Model theory, *Magnetic materials), Field theory, Density, Force (Mechanics).

The Chu formulation of electrodynamics can be interpreted in terms of models for polarization and magnetization. These models have previously been used to interpret Mawell's equations, and here the model for magnetization is used to interpret the force density for a moving magnetizable medium. (Author)

AD-636 369 **See Field 20L**

AD-636 602 **See Field 20L**

AD-636 625 **See Field 20L**

AD-636 650 **See Field 9E**

AD-636 680 **See Field 7D**

AD-637 050 **See Field 20E**

AD-637 062 **See Field 8G**

20D. FLUID MECHANICS

AD-415 245 **Field 20D**
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.
LENGTH OF THE LAMINAR HYPERSONIC WAKE DURING THE BALLISTIC RE-ENTRY OF A BLUNT OBJECT.
by Paul S. Lykoudis. Aug 63, 11p P-2781

Descriptors: (*Blunt bodies, Wake), Hypersonic flow, Laminar flow, Hypersonic characteristics, Nose cones, Mathematical analysis.

The present work was undertaken in order to point out that what is called in an earlier paper the nonsteady solution is the steady one, properly understood, and also to show how results can be obtained in a closed form without the need of numerical integrations.

AD-468 253 **Field 20D**
CFSTI Prices: HC$9.60 MF$0.75
Hydronautics, Inc., Laurel, Md.
THE EFFECT OF EJECTED POLYMER SOLUTIONS ON THE RESISTANCE AND WAKE OF A FLAT PLATE IN A WATER FLOW.
by Richard H. Dove. Jun 65, 98p Technical rept.
TR-353-2
Contract Nonr-4181 (00)
Proj. NR-062-325

Descriptors: (*Turbulent boundary layer, Flat plate models), (*Viscoelasticity, Drag), Polymers, Ejection, Wake, Spheres, Manometers, Water, Fluid flow, Measurements, Turbulence, Hydrodynamics, Fluid dynamic properties.

An experimental investigation was made into the effects of injecting non-Newtonian fluids into the turbulent boundary layer of a flat plate. The ejection of weakly viscoelastic solutions of a macromolecular polymer at the leading edge of the plate decreased its drag coefficient by as much as 50 percent; the Reynolds number of the plate was 1.8 x 10 to the sixth power. It was found that for a given ejection rate and free stream velocity there was a solution concentration for which the drag coefficient was a minimum. It is conjectured that the relatively sharp loss of effectiveness for higher concentrations may be due to insufficient mixing of the additive into the turbulent boundary layer. Ejection of neutrally buoyant spherical particles, not too much larger than the macromolecules, has no effect on the drag of the plate, indicating that the drag reduction is probably associated with the viscoelastic properties of the solutions studied. (Author)

AD-468 372 Field 20D, 13G
CFSTI Prices: HC$3.80 MF$1.75
Alabama Univ., University. Bureau of Engineering Research.
A STUDY AND COMPILATION OF THE ENGINEERING FOUNDATIONS FOR FLUID AMPLIFICATION (THE FUNDAMENTALS OF FLUID MECHANICS).
by Harold R. Henry. Feb 65, 203p Ala-U/BER-310(Z)-R-Feb-65
Contract DA-01-021-AMC-310Z

Descriptors: (*Fluid mechanics, *Fluid amplifiers), Continuum mechanics, Vortices, Differential equations, Fluid flow, Stresses, Equations of motion, Momentum, Differential geometry, Acoustics, Mathematical models, Mathematical analysis, Thermodynamics, Theory.

Contents: Introduction and concept of the continuum; velocity; differentials and derivatives; the equation of continuity; vorticity, circulation, irrotationality; stress; the momentum theorem and the equation of motion; the angular momentum theorem; energy; one dimensional analyses; acoustics; similarity and modeling.

AD-636 287 Field 20D, 11F
CFSTI Prices: HC$1.60 MF$0.50
United Aircraft Corp., East Hartford, Conn. Research Labs.
SCATTERING OF MOLECULAR BEAMS BY METALLIC SURFACES.
by John J. Hinchen, and William M. Foley. 24 Jul 64, 20p UAR-C117
Contract N600 (19)61950
Presented at the International Symposium on Rarefied Gas Dynamics (4th), Toronto, Canada, July 14-17, 1964.

Descriptors: (*Molecular beams, Scattering), (*Helium group gases, Scattering), (*Platinum, Surface properties), Cleaning, Surfaces, Phase shift, Diffusion, Distribution.

Modulated molecular beam techniques were employed to measure the spatial distribution of rare gases reflected or scattered from polycrystalline platinum. The density distribution of the molecules about the target was measured with a movable detector and molecular velocity changes which occurred during collisions between the beam and target at different temperatures were determined through observation of shifts in the phase of the modulated beam signals. The results are that diffuse scattering is obtained from "dirty" surfaces, while the reflections obtained after surface cleaning by heating at a pressure of 10 to the minus 9th power torr are specular in character. The reflected beams are not, however, found at the true specular angle, and the dependence of this angular deviation on experimental parameters was studied. From the data of collision induced molecular velocity changes, energy accommodation coefficients are calculated, and the results are correlated with changes in scattering distributions. Accommodation coefficients obtained with a clean platinum surface agree with literature values for clean metallic surfaces as determined by a hot filament technique. (Author)

AD-636 323 Field 20D
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Gas Turbine Lab.
UPSTREAM HISTORY AND APPARENT STRESS IN TURBULENT BOUNDARY LAYERS.
Technical rept. for Oct 65-May 66.
by Perry Goldberg. May 66, 112p Rept. no. 85
Contract Nonr-1841 (91)
Proj. S-F009-01-01

Descriptors: (*Turbulent boundary layer, Theory), Two-dimensional flow, Incompressible flow, Stresses, Mathematical analysis.

A comprehensive experimental and analytical study specifically designed to investigate upstream history and apparent stresses in incompressible, two-dimensional, turbulent boundary layers has been conducted. Hot-wire measurements of turbulent shear stress and longitudinal turbulence intensity, as well as velocity profiles and wall shear stress measurements, were made for six different pressure distributions. It was found that the turbulent shear stress is dependent upon the upstream history of the flow and not a unique function of the local velocity profile. A simple equation for the dissipation integral with a constant K was found to represent the data well. This expression was used with the mean-flow energy integral equaiton to obtain a practical method for predicting turbulent boundary layer behavior which accounts for upstream history. The predictions made with this method for the six pressure distributions of this study and for others extracted from the literature agreed well with the experimental data. (Author)

AD-636 352 Field 20D
Pennsylvania State Univ., University Park.
WALL REGION IN TURBULENT SHEAR FLOW OF NON-NEWTONIAN FLUIDS.
by H. Tennekes. 24 Nov 65, 8p
Grant Nonr (G)-00043-65

Descriptors: (*Fluid flow, *Turbulence), Shear stresses, Walls, Energy, Reynolds number, Velocity, Viscoelasticity, Mathematical analysis.

Identifiers: Shear flow, Non-Newtonian fluids.

A revision of mixing-length theory for wall-bounded turbulent shear flows is proposed. An analysis of the energy balance of medium-sized eddies (those that scale with the distance from the wall) suggests that the slope of the logarithmic velocity profile should be proportional to the square root of the Reynolds stress at the location where most of the turbulent energy is produced. Application of this prediction to turbulent flow of power-law fluids indicates that the slope of the velocity profile decreases with decreasing flow-behavior index, in excellent agreement with experimental data. Visco-elasticity may change the thickness of the viscous sublayer, but not the slope of the velocity profile. (Author)

AD-636 431 Field 20D
CFSTI Prices: HC$5.00 MF$1.00
Pennsylvania State Univ., University Park. Ordnance Research Lab.
AN INVESTIGATION OF THERMODYNAMIC EFFECTS ON CAVITATION IN WATER FROM 80 DEGREES F TO 180 DEGREES F ON HEMISPHERICAL-NOSED BODIES.
Technical memo.
by G. S. Seidel Jr. 2 Jun 66, 170p
Contract NOw-65-0123-d

Descriptors: (*Thermodynamics, *Cavitation), Water tunnels, Fluid mechanics, Hemispherical shells.

The effects of variations in temperature on desinent and developed cavitation were investigated theoretically and experimentally. The experimental portion of the investigation was carried out with hemispherical nosed models of 1/4-inch and 1/2-inch diameters in the NASA ultra-high speed cavitation tunnel. Velocities were varied from 44 to 130 feet per second and temperatures were varied from 80F to 180F. Cavitation numbers were found to increase with velocity and temperature for desinent cavitation. For developed cavity flows, the cavitation numbers were found to increase or remain constant with increasing temperature. For developed cavity flow, both increases and decreases in cavitation numbers with velocity were observed. A theoretical method of predicting cavitation numbers was developed from the quasi-static approach used previously in pump applications. The theory was applied to desinent and to developed cavitation. Thermodynamic effects in desinent cavitation were found to be important only at the lowest velocity and highest temperature investigated. In developed cavity flows, it was found that in addition to thermodynamic effects, gas effects may be important. (Author)

AD-636 432 Field 20D
CFSTI Prices: HC$2.00 MF$0.50
Technion - Israel Inst. of Tech., Haifa.
CROSS STRESSES IN THE FLOW OF GASES.
Technical rept. 1 Jul 65-30 Jun 66.
by Markus Reiner. Jun 66, 36p MS-30/R1
Contract N62558-4562

Descriptors: (*Gas flow, *Vortices), Stresses, Fluid mechanics, Centrifugal fields, Cylindrical bodies.

Identifiers: Centripetal effect.

The history of the cross-stress effect in gases is reviewed. A new Centripetal Flow Instrument (C.F.I.) for the investigation of the effect is described. (Author)

AD-636 438 Field 20D
CFSTI Prices: HC$4.00 MF$1.00
California Inst. of Tech., Pasadena. Hydrodynamics Lab.
ON THE ADDED MASS OF A SPHERE IN A CIRCULAR CYLINDER CONSIDERING REAL FLUID EFFECTS.
by Stanley B. Mellsen, Albert T. Ellis, and John G. Waugh. Mar 66, 137p Rept. no. E-124.1
Contract N600 (19)59368
Task RRRE-04001/216-1/R009-01-01

Descriptors: (*Drag, *Spheres), Fluids, Cylindrical bodies, Electromagnetism, Motion.

An experimental method combined with boundary layer theory is given for evaluating the added mass of a sphere moving along the axis of a circular cylinder filled with water or oil. The real fluid effects are separated from ideal fluid effects. The experimental method consists essentially of a magnetic steel sphere propelled from rest by an electromagnetic coil in which the current is accurately controlled so that it only supplies force for a short time interval which is within the laminar flow regime of the fluid. The motion of the sphere as a function of time is recorded on single frame photographs using a short-arc multiple flash lamp with accurately controlled time intervals between flashes. A concept of the effect of boundary layer displacement on the fluid flow around a sphere is introduced to evaluate the real fluid effects on the added mass. Surprisingly accurate agreement between experiment and theory is achieved. (Author)

AD-636 495 Field 20D, 9B, 14B
CFSTI Prices: HC$1.00 MF$0.50
Army Missile Command, Redstone Arsenal, Ala. Advanced Systems Lab.
COMPUTER METHOD FOR WIND TUNNEL DATA ANALYSIS.
by Carl L. Adams. 14 Apr 66, 9p
Proj. DA-1L013001A91A
AMC-RD-TM-66-5

Descriptors: (*Aerodynamics, *Programming (Computers)), Wind tunnels, Data.

A computer method has been developed to aid in analysis of static stability data from wind tunnel tests of symmetric bodies. A third-order least-squares curve fit is used to slope the test data and shift its origin to zero. The method provides a rapid, consistent means of analyzing test data with indications of quality of fit. This method is especially useful in extracting incremental effects of minor configuration changes. A copy of a computer program using this method is included. (Author)

AD-636 501 Field 20D
CFSTI Prices: HC$2.00 MF$0.50
California Inst. of Tech., Pasadena. Div. of Engineering and Applied Science.

FLOW IN A PRECESSING SPHERICAL ENCLOSURE. II. LOW VISCOSITY.
by Guilio Venezian. Jun 66. 48p Rept. no. 85-34
Contract Nonr-220 (28)

Descriptors: (*Fluid flow, Spheres), Viscosity, Incompressible flow, Approximation (Mathematics), Partial differential equations.

The flow of an incompressible fluid of low viscosity within a precessing spherical enclosure is treated in the linear approximation which requires a small precessional speed or a small angle between the precession and rotation vectors. An approximate solution to the problem is obtained by matching a boundary layer flow to a suitable interior flow. Two flow regimes exist, depending on whether the precession is fast or slow. This latter case presents some interesting phenomena, associated with a breakdown in the boundary layer equations and the change from an elliptic to a hyperbolic system of equations that describe the interior flow. The Bondi-Lyttleton problem of flow within a spherical enclosure that is precessing at an extremely low rate is discussed in detail. (Author)

AD-636 505 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
INTERACTION BETWEEN THE BOUNDARY LAYER AND THE HYPERSONIC FLOW IN A CONICAL NOZZLE.
ATD work assignment no. 88.
by V. P. Agafonov. 16 May 66. 10p ATD-66-54
TT-66-61899
Vzaimodeistvie Pogranichnogo Sloya c Giperzvukovym Potokom v Konicheskom Sople. trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika. n5 p154-7 1965. Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Hypersonic flow, *Boundary layer), (*Conical nozzles, Nozzle gas flow), Supersonic flow, Mathematical analysis, USSR.

A discussion is given of the calculation of gas-dynamic parameters of the flow, nozzle calculations, and calculation of the flow in a nozzle of given shape. It is shown that by using an integral continuity equation it is possible to close a system of equations and to solve the problem of supersonic flow in a conical nozzle with allowance for the interaction with the boundary layer. The results of the calculations indicate that, in general, the growth of the boundary layer during hypersonic gas flow in a conical nozzle can lead not only to a marked decrease in the size of the isentropic flow core, but also to the appearance of substantial irregularities in the distribution of all the gas-dynamic parameters in the transverse section of the nozzle.

AD-636 522 **Field 20D, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
MONTE CARLO EVALUATION OF THE BOLTZMANN COLLISION INTEGRAL.
by Arnold Nordsieck, and Bruce L. Hicks. Jul 66, 32p R-307
Contracts DA-28-043-AMC-00073 (E), N00014-66-C0010-A01
Proj. DA-20014501B31F
Presented at the International Symposium on Rarefied Gas Dynamics (5th), Oxford Univ., July 4-8, 1966.

Descriptors: (*Superaerodynamics, Kinetic theory), (*Monte Carlo method, *Kinetic theory), Integrals, Relaxation time, Elastic scattering, Differential cross section.

A Monte Carlo method of solving the fundamental equation of the kinetic theory of dilute gases has been developed and successfully applied to two problems, one involving translational relaxation of a spatially homogeneous gas and the other a plane steady shock of arbitrary strength (shock strength limited only by the fineness of the velocity space mesh). This is the first and only method capable of computing the molecular velocity distribution under conditions far from equilibrium. The essence of the problem is evaluation of the nonlinear five-dimensional collision integral. Straight forward numerical quadrature would require about a year on the fastest present day computers. The computation time is reduced to a practical value, of the order of an hour, by a statistical sampling technique closely resembling the real statistical collision phenomena in the gas. Computations to date have been restricted to elastic sphere scattering of molecules without internal degrees of freedom. Differential scattering cross-sections other than elastic sphere can be accommodated in the computer program without complications or computing time penalty. Introduction of one or two internal molecular degrees of freedom will increase the complexity and computing time, but not to an impractical degree.

AD-636 523 **Field 20D, 12A, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
ON THE ACCURACY OF APPROXIMATE SOLUTIONS OF THE BOLTZMANN EQUATION.
by S. M. Yen, and Bruce L. Hicks. Jul 66, 30p R-308
Contracts DA-28-043-AMC-00073 (E), N00014-66-C0010-A01
Proj. DA-20014501B31F
Presented at the International Symposium on Rarefied Gas Dynamics (5th), Oxford Univ., July 4-8, 1966.

Descriptors: (*Approximation (Mathematics), *Superaerodynamics), (*Integral equations, Approximation (Mathematics)), Distribution functions, Kinetic theory.

Tests of the accuracy of approximate solutions of the Boltzmann equation for rarefied gas flow problems under conditions of strong deviation from thermal equilibrium have been developed by using the Nordsieck-Hicks Monte Carlo method of evaluating the collision integral. We have made and interpreted the tests for three approximate solutions for shock waves: Mott-Smith, 6-moment, and Navier-Stokes. In particular we have studied the collision integral for three approximate solutions, the distribution of errors of the solutions in velocity space, their relative inaccuracies at different positions in the shock, and certain moments of their distribution functions and collision integrals that are not calculable analytically. (Author)

AD-636 590 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
METHOD OF CHARACTERISTICS FOR EQUILIBRIUM FLOWS OF AN IMPERFECT GAS.
by I. N. Naumova. 4 Apr 66, 47p FTD-TT-65-1700
TT-66-61913
Edited trans. of mono. Method Kharakteristik dlya Ravnovesnykh Technii Nesovershennogo Gaza, Moscow 1964 44p.

Descriptors: (*Supersonic flow, Mathematical analysis), Gas flow, Axially symmetric flow, USSR, Shock waves, Equations.

Identifiers: Method of characteristics.

For abstract, see T 66 18.

AD-636 658 **Field 20D, 20I**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ABOUT ONE CONDITION OF ACCELERATION OF MAGNETOGAS-DYNAMIC FLOWS.
by N. I. Polskii. 25 May 66, 7p FTD-TT-65-1676
TT-66-61919
Unedited rough draft trans. of unidentified mono., Kiev, 1964 p227-9.

Descriptors: (*Magnetohydrodynamics, Dynamics), Acceleration, Gas flow, USSR.

For abstract, see T 66 18.

AD-636 731 **Field 20D, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
TWO NUMERICAL METHODS FOR CALCULATING AXISYMMETRIC FLOW.
Memo. rept.
by Edwin H. Rogers. May 66, 28p BRL-MR-1745
Proj. RDT/E-1P014501A14B

Descriptors: (*Numerical methods + procedures, *Axially symmetric flow), Compressible flow, Difference equations, Partial differential equations, Fluid mechanics.

Numerical methods, on which two computer codes (a Tech/Ops two-dimensional hydrodynamic code and General Atomics' OIL code) designed to calculate axisymmetric, inviscid, compressible flow by direct application of conservation laws are based, are given difference equation formation. The difference equation formulations are compared to one another and to the partial differential equations of such flow. Sample calculations are compared with the analytical solutions of the differential equations. (Author)

AD-636 750 **Field 20D, 1A**
CFSTI Prices: HC$2.00 MF$0.50
David Taylor Model Basin, Washington, D. C. Aerodynamics Lab.
A PRELIMINARY INVESTIGATION TO STUDY THE EFFECT OF FLAT SPOILERS ON THE AERODYNAMIC CHARACTERISTICS OF WINGS AT ANGLES OF ATTACK FROM 0 DEGREES TO 90 DEGREES.
Research and development rept.
by Gary W. Brasseur. Apr 66, 34p Aero-1113
Task RAD34B-001/440-1/F012-01-06
DTMB-2214

Descriptors: (*Spoilers, *Tilt wings), (*Aerodynamic characteristics, Tilt wings), (*Convertible planes, Stability), Angle of attack, Model tests.

Flat spoilers were tested on a semispan wing as a possible leading-edge, upper-surface device for controlling flow separation on wings rotated through 90 degrees for application to tilt-wing V/STOL aircraft. Model tests indicated that a spoiler height of 0.10 wing chord at the 0.15 wing chord location was capable of partially controlling flow separation. (Author)

AD-636 751 **Field 20D, 1A**
CFSTI Prices: HC$1.00 MF$0.50
David Taylor Model Basin, Washington, D. C. Aerodynamics Lab.
EXPERIMENTAL STUDY OF THE DECAY OF TURBULENCE.
Research and Development rept.
by Stavros Loezos. Jun 66, 13p Aero-1114
Proj. WF012-0106
DTMB-2238

Descriptors: (*Experimental data, *Turbulence), Wake, Cylindrical bodies, Vortices, Honeycomb construction, Aircraft carriers, Hot-wire anemometers.

Limited studies of the decay pattern of induced turbulence behind cylinders were conducted. The results are shown to correlate with similar data behind grids or honeycombs, and support the validity of the tu rbulence decay method of analysis. The results also substantiate the theory that the decay rate of a given vortex is unaffected by the interaction of adjacent vortices. (Author)

AD-636 924 **Field 20D**
CFSTI Prices: HC$4.00 MF$1.00
Michigan Univ., Ann Arbor.
THE INFLUENCE OF LOCALIZED, NORMAL SURFACE OSCILLATIONS ON THE STEADY LAMINAR FLOW OVER A FLAT PLATE.
Final scientific rept.
by Tsung Yen Na, Vedat S. Arpaci, and John A. Clark. Jan 66, 127p
Contract AF 33 (657)-8368
Proj. AF-7063
ARL-66-0010-Pt-2

Descriptors: (*Laminar flow, *Flat plate models), Laminar boundary layer, Oscillation, Vibration, Perturbation theory, Numerical analysis.

The steady, laminar flow of an incompressible fluid over a locally vibrating semi-infinite flat plate is analyzed. The problem is formulated in the coordinate system fixed to the plate. The formulation is simplified by considering the unsteady flow to be of the boundary layer type. The resulting equations for the unsteady boundary layer are linearized by means of a perturbation procedure. The first three approximations are solved by the integral method. It is found that the phase of skin friction in relation to the input disturbance is approximately zero, while that of heat transfer lags approximately pi/2 radians. The time-averaged value of the skin friction is slightly greater than its steady value in the absence of oscillations. The time-averaged heat transfer, however, is slightly less than its corresponding steady value. It is also found that the localized oscillations increases the flow instability locally. The physical interpretation of the restraints on the analysis are discussed. (Author)

AD-636 929 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
AN EXTENDED LIFTING LINE THEORY FOR THE LOADS ON A ROTOR BLADE IN THE VICINITY OF A VORTEX.
Technical rept.
by J. P. Jones. Dec 65, 47p TR-123-3
Contract NOw-64-0188-d

Descriptors: (*Rotor blades (Rotary wings), *Aerodynamic loading), Lift, Vortices, Theory, Aspect ratio.

An extension of the lifting line theory is described which is based upon the argument that in the vicinity of the vortex the flow pattern will be more like that on a low aspect ratio wing, while still retaining the characteristics of high aspect ratio well away from the vortex. Spanwise circulation distributions are given for a blade of aspect ratio 20 for vortex distances from the blade varying between chord and one-tenth chord. The results of lifting line and modified lifting theory are compared and it is found that, except when the vortex is very close to the blade, there is little to choose between the results. When the vortex is very close to the blade, the modified theory predicts appreciably smaller circulation and a less peaky spanwise distribution near to the vortex, but no fundamental changes are found and it is thought unlikely that a more sophisticated lifting surface theory will lead to any significant changes in the results. Some suggestions are made as to the proper procedure for developing a lifting surface theory. (Author)

AD-636 981 **Field 20D**
CFSTI Prices: HC$6.00 MF$1.25
General Electric Co., Evendale, Ohio. Advanced Technology and Demonstrator Programs Dept.
INVESTIGATION OF HYPERSONIC INLET SHOCK-WAVE BOUNDARY LAYER INTERACTION. PART II. CONTINUOUS FLOW TEST AND ANALYSES.
Rept. for Jul 63-Apr 66.
by Paul H. Kutschenreuter Jr, David L. Brown, and Werner Hoelmer. Apr 66, 263p
Contract AF 33 (657)-11747
AFFDL-TR-65-36

Descriptors: (*Duct inlets, *Hypersonic flow), (*Boundary layer, *Shock waves), Tests, Analysis, Flow separation, Models (Simulations), Turbulence, Laminar boundary layer.

The computational procedure developed in Phase I for estimating laminar boundary layer properties through impinging shock induced laminar boundary layer interactions was modified to account for entropy change of the inviscid streamlines in that isentropic assumptions were used in the initial formulation. Perturbation studies on the effects of wall shear on interaction length have identified the importance of the profile shape factor in such calculations. A Users' Manual for the laminar computational program is contained. Three incident shock models were designed for use in the experimental program conducted in the Ames 3.5 Foot Hypersonic Tunnel. Aided by analysis of the experimental data, a simplified flow model was formulated for the case of a two-dimensional turbulent boundary layer incident shock interaction. (Author)

AD-636 992 **Field 20D, 20K**
CFSTI Prices: HC$7.00 MF$1.75
Foreign Technology Div., Wright-Patterson AFB, Ohio.
JOURNAL OF APPLIED MECHANICS AND TECHNICAL PHYSICS: COLLECTION OF ARTICLES.
28 Feb 66, 338p FTD-MT-64-319
TT-66-62026
Edited Machine trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n3 p1-185 1964.

Descriptors: (*Mechanics, Reviews), (*Physics, Reviews), Fluid flow, USSR, Explosions, Combustion, Mechanical working.

Contents: Propagation of a system of cracks in an elastic-brittle material, Dynamic compressibility of hard rocks and metals, Anisothropic creep, Beams of like-charged particles, Tensor of viscous stresses and thermal flux in a two-temperature partially ionized gas, Partially ionized two-temperature plasma, Equations for study of completely ionized gas, Magnetohydrodynamic channel of rectangular section with nonconducting walls, Cooling by radiation of gas, Laminar boundary layer in a radiating-absorbing gas, Parameters of gas fluxes, Three-dimensional gas-dynamic flows, Disintegration of a drop, Influence of the relative velocity of a gas bubble in a liquid on change of its dimensions, Stability of a collapsing gas cavity, Thermal explosion, Burning velocity of powder, Influence of pressure on the normal velocity of the flame of a methane-air mixture, Burning velocity of various fuel systems, Temperature distribution during burning of ammonium perchlorate, Explosion on the surface of a liquid, Scattering of a gas cloud in a vacuum, Steady axisymmetric flows of gas, Wave packet in hydrodynamics, Optimum suction of fluid from the boundary layer of wing profiles, Speed of sound in liquid and gaseous argon, Temperature state of a semitransparent spherical shell, Hardening, Rolling a visco-elastic cylinder on a base of the same material.

AD-636 998 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Aerospace Engineering and Applied Mechanics.
ON SIMILARITY SOLUTIONS OF UNSTEADY VISCOUS FREE-MIXING.
Interim scientific rept.
by M. H. Steiger, and G. Longspaugh. May 66, 20p PIBAL-885
Contract AF 49 (638)-1623
Proj. AF-9781
Task 978101
AFOSR-66-0933

Descriptors: (*Jet mixing flow, Viscosity), Wake, Perturbation theory, Boundary layer, Mathematical analysis.

Unsteady, incompressible, planar and axisymmetric, laminar free-mixing is investigated by a boundary layer type analysis with similarity methods. Four types of flows are considered; namely, the asymptotic symmetric wake wherein the equations are linearized with respect to velocity perturbations, the symmetric wake wherein velocity differences can be large, the jet issuing into a quiescent ambient, and the asymmetric wake, i.e., the merging of two semi-infinite planar streams. Similarity solutions are shown to exist in all but one of the aforementioned flows; the exception is the axisymmetric jet. Solutions of the asymptotic wake, the two-dimensional nonlinear wake and the two-dimensional jet are presented. (Author)

AD-637 056 **Field 20D**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
IMPACT PRESSURE BEHAVIOR IN RAREFIELD HYPERSONIC FLOW.
Revised ed.
by F. L. Daum, J. S. Shang, and G. A. Elliott. 17 May 65, 5p ARL-66-0063
Proj. 7065
Task 706500
Revision of manuscript submitted 27 Jan 65.

Descriptors: (*Hypersonic flow, Superaerodynamics), (*Blunt bodies, Pressure), Reynolds number, Impact shock.

The investigation was conducted for the purpose of (1) extending the knowledge of the governing flow parameters further into the rarefield flow regime, (2) gaining a further insight of the mechanisms affecting the blunt-body impact pressure behavior, and (3) providing experimental data demonstrating the measurement characteristics of blunt impact pressures probes at low Reynolds numbers and elevated hypersonic Mach numbers. (Author)

AD-637 059 **Field 20D, 20M**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
EXPERIMENTAL INVESTIGATION AND CONFIRMATION OF THE REVERSED HEAT CONDUCTION IN NATURAL CONVECTION AT A THERMAL LEADING EDGE ON A VERTICAL WALL.
Scientific rept.
by Max G. Scherberg, and M. Anandha Rao. Dec 65, 14p ARL-65-271
Proj. AF-7063

Descriptors: (*Leading edge, Thermal conductivity), (*Convection (Heat transfer), Walls), Boundary layer, Temperature.

An analysis and solution of the hitherto unsolved thermal leading-edge problem was recently completed. It predicted, among other things, the unanticipated result that near a thermal leading edge the heat conduction reverses and heat flows into the wall. The present experimental investigation was conducted to check primarily this prediction and also the other predictions of the analysis in so far as possible. Temperatures were measured with a 0.33-in-long and 1.5 x .00015-in-dia platinum wire probe near the thermal leading edge of a vertical glass wall which was designed to give approximately the temperature setting used in the analysis. Although the experimental wall temperature distribution did not match that in the analysis, the reversal in heat conduction was confirmed. Measured boundary-layer temperatures are also compared with the theory. (Author)

AD-637 118 **Field 20D, 20I1i, 21B**
CFSTI Prices: HC$7.00 MF$1.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
JOURNAL OF APPLIED MECHANICS AND TECHNICAL PHYSICS: COLLECTION OF ARTICLES.

28 Feb 66, 326p FTD-MT-64-87
TT-66-62055
Edited machine trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n2 p1-176 1963.

Descriptors: (*Mechanics, Reviews), (*Physics, Reviews), (*Fluid flow, Reviews), Bibliographies, Magnetohydrodynamics, Mechanical properties, Combustion, Soil mechanics, Shock waves, Electrolytes, Explosive materials, USSR.

Contents: Hydrodynamics of relaxing media, Cylindrical arc in argon, Current distribution in a conducting medium, Propagation of the initial pulse in magnetohydrodynamics, Equations of steady flow of an incompressible viscous and conducting fluid, Kinetic equation of charged particles, Flow of ideal fluids past permeable surfaces, Convection diffusion in the presence of heterogeneous chemical reactions, Mechanical properties of nonuniform sandwich media, Equilibrium of plates, Creep rupture, Creep buckling with calculation of instantaneous plastic flows, Use of the Kerr effect for studying stress of thin-walled constructions, Explosion in certain ideal compressible media, Stress waves in soft grounds, Similarity of shock waves during the explosion of spherical charges in water and in air, Soil dynamics, The laminar frontier layer in a solution of electrolyte with crossed magnetic and electrical fields, Breakup of drops and a fluid stream, Specific heat of tantalum, Specific heat of benzoic acid, Temperature fields in cooled disks, Influence of light radiation on the rate of burning of nitroglycerine powder, The structure of a flame front, Thermal effect of the initial stage of burning of powders and explosives, Correction to Work 'Certain problems of the theory of ignition', Correction to Article 'On stability of rotary motions of a gyroscope with a cavity, incompletely filled with liquid'.

AD-637 126 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF TWO-DIMENSIONAL JET-FLAP AERODYNAMIC INTERACTION AT SUPERSONIC SPEEDS.
Technical rept.
by Norman E. Hawk, and James L. Amick. Oct 65, 48p APL/JHU-CR-23
Proj. ORA-06089
ORA-06089-1-T.

Descriptors: (*Jet flaps, Aerodynamic characteristics), (*Supersonic flight, Jet flaps), Two-dimensional flow, Model tests, Stagnation point.

Two-dimensional jet flap aerodynamic interaction tests were conducted in the 8 in. x 13 in. supersonic tunnel at Mach number 3.97 and Reynolds number 120,000 per inch. The test model consisted of a wedge of rectangular planform equipped with side plates and a full span jet slot. The primary data taken were jet mass flow, normal force increment due to the jet, and schlieren photographs. The specific impulse ratios obtained varied from 3.6 at the lowest jet force parameter to 2.5 at the highest jet force parameter. (Jet force parameter is defined as the jet stagnation pressure times jet slot width, divided by free-stream pressure times body length.) For the range of variables covered in the present experiment the jet force parameter was found to govern the flow geometry, including transition in the separated shear layer. Data on aerodynamic interaction in the case of the approximately two-dimensional, sonic jet flap have been collected from four sources. The available data for specific impulse ratio were correlated, mostly within plus or minus 10%, over a hundredfold range of a dimensionless parameter consisting of the jet force parameter multiplied by a free stream Mach number function. An inviscid theory was developed to provide an analytical justification for the dependence on the parameter. (Author)

N66-10658 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Officine Di Villar Perosa, S.P.A., Turin (Italy). Sezione Calibri E Strumenti.
HANDLING FLUIDICS FOR PRACTICAL APPLICATIONS.
Paper no E5.
by M. Monge. 1965, 23p
Prepared for presentation at Intern. Conf. on Fluid Logic and Amplification (1st.), Brit. Hydromech. Res. Assoc. and Coll. of Aeron, Cranfield, England, 8-9 Sep. 65.

Descriptors: *Fluid switching element, *Circuit, *Fluid mechanics.

For abstract, see T 66 18.

N66-10742 **Field 20D**
CFSTI Prices: HC$4.00 MF$0.75
Ansaldo S.P.A., Genoa (Italy). Fiat S.P.A., Turin (Italy).
FORCED CONVECTION BURNOUT AND HYDRODYNAMIC INSTABILITY EXPERIMENTS FOR WATER AT HIGH PRESSURE. PART I-PRESENTATION OF DATA FOR ROUND TUBES WITH UNIFORM AND NON-UNIFORM POWER DISTRIBUTION.
by F. Biancone, A. Campanile, G. Galimi, and M. Goffi. Aug 65, 105p
Contract EURATOM-008-61-12 PNII
EUR-2490.E
Prepared in cooperation with Fiat S.P.A., Turin (Italy) and Soc. Ric. Impirnti Nucleari, Saluggia (Italy).

Descriptors: *Hydrodynamics, *Tube, *Burnout, *Instability.

N66-10952 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
British Hydromechanics Research Association, Harlow (England).
A SHORT REVIEW OF PAST RESEARCH INTO THE PROPERTIES OF FLUID JET AMPLIFIERS.
by R. S. Neve. Feb 65, 25p TN-838

Descriptors: *Fluid jet amplifier.

N66-15771 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Southwest Research Inst., San Antonio, Tex.
SOME NOTES ON LIQUID SLOSHING IN COMPARTMENTED CYLINDRICAL TANKS.
Technical rept. no. 1.
by H. N. Abramson, L. R. Garza, and D. D. Kana. 15 Feb 62, 19p
Contract NAS8-1555
NASA-CR-69545

Descriptors: *Cylindrical tank, *Liquid sloshing, *Propellant tank, *Frequency response, *Rigid structure.

N66-15795 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.75
Marseille Univ. (France). Inst. De Mecanique Des Fluides De Marseilles.
EXPERIMENTAL STUDY AT M EQUALS 7 OF THE BOUNDARY LAYER INFLUENCE OF A FLAT PLATE ON THE TRANSFER OF HEAT TO THE SURFACE OF A CYLINDER INCIDENT TO THAT PLATE.
1965, 90p NT-2/7648-A, ONERA-510.521

Descriptors: *Aerodynamics, *Hypersonic speed, *Laminar boundary layer, *Convective heat transfer, *Flat plate, *Turbulent boundary layer.

N66-16234 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Philadelphia, Pa. Missile and Space Div.
THE STRUCTURE OF THE VISCOUS HYPERSONIC SHOCK LAYER.
by L. Goldberg. Dec 65, 67p R65SD50
Contract SNPC-29
NASA-CR-69831

Descriptors: *Mass transfer, *Viscous flow, *Hypersonic shock, *Mathematical model, *Shock layer.

N66-16715 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Southwest Research Inst., San Antonio, Tex.
PRESSURES ON RING BAFFLES. DAMPING COEFFICIENTS FOR MECHANICAL MODELS OF LIQUID SLOSHING.
Quarterly progress rept. no. 16, 1 Jan-31 Mar 65.
by H. N. Abramson. 5 Apr 65, 12p
Contract NAS8-1555
NASA-CR-70021

Descriptors: *Fuel tank, *Harmonic analysis, *Sloshing, *Damping, *Ring structure.

N66-16717 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
BUBBLE FORMATION AND GROWTH. STUDY OF THE BOUNDARY CONDITIONS AT THE BUBBLE WALL THROUGH IRREVERSIBLE THERMODYNAMICS.
Progress rept., 17 Feb-30 May 65.
by K. R. Chun, and A. Shavit. Jun 65, 76p
Contract NAS8-20013
NASA-CR-70023

Descriptors: *Kinetic theory, *Liquid-vapor interface, *Thermodynamics, *Bubble.

N66-16923 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
General Motors Corp., Indianapolis, Ind.
A SPECTROSCOPIC METHOD OF TEMPERATURE MEASUREMENT WHICH DOES NOT REQUIRE TRANSITION PROBABILITIES.
by R. T. Schnfider, H. E. Wilhelm, and W. N. Woerner. Feb 66, 37p
Contract NASw-922
NASA-CR-382

Descriptors: *Spectral line, *Plasma, *pressure measurement, *Spectroscopy, *Temperature measurement.

N66-17580 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Arc Heater Dept.
ENERGY ADDITION METHODS FOR HYPERVELOCITY TRUE FLIGHT SIMULATION.
1965, 91p
Contract NAS1-3629
NASA-CR-64831

Descriptors: *Magnetohydrodynamic acceleration, *Wind tunnel, *Arc heating, *Energy source, *Flight simulation, *Hypervelocity flow.

N66-17653 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.75
British Columbia Univ., Vancouver. Dept. of Mechanical Engineering.
JETS AND WAKES IN STREAMING LAMINAR FLOW.
by Z. Rotem, and I. J. Wygnanski. Aug 65, 97p
Contract NRC A-2772

Descriptors: *Incompressible fluid, *Newtonian fluid, *Stream function, *Velocity distribution.

N66-17658 **Field 20D**
CFSTI Prices: HC$4.00 MF$0.75
McGill Univ., Montreal (Quebec). Mechanical Engineering Research Labs.
AN EXTENSION OF A TURBULENT INCOMPRESSIBLE BOUNDARY LAYER THEORY TO COMPRESSIBLE BOUNDARY LAYERS.

by R. M. C. So. Dec 65, 106p TN-65-6
Contract DRB 9550-06

Descriptors: *Pressure gradient, *Turbulent boundary layer, *Velocity profile, *Incompressible flow.

N66-18456 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.50
LTV Aerospace Corp., Dallas, Tex.
INVESTIGATION OF THE TURBULENT SHEAR FLOW OF DILUTE AQUEOUS CMC SOLUTIONS.
by W. D. Ernst. Mar 66, 58p
Contract NASw-729
NASA-CR-395

Descriptors: *Fluid boundary, *Shear flow, *Turbulent flow.

N66-18479 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.50
National Bureau of Standards, Boulder, Colo. Inst. of Materials Research.
A METHOD FOR ANALYZING THERMAL STRATIFICATION AND SELF PRESSURIZATION IN A FLUID CONTAINER.
by R. W. Arnett, and D. R. Millhiser. 1 Apr 65, 52p NBS-8777
Contract NASA Order-C-69726
NASA-CR-54527

Descriptors: *Container, *Gas-liquid interaction, *Phase transformation, *Pressurization, *Temperature gradient.

AD-636 298 **See Field 21E**

AD-636 392 **See Field 1A**

AD-636 668 **See Field 20K**

AD-636 719 **See Field 7D**

AD-636 720 **See Field 20I**

AD-636 735 **See Field 17G**

AD-636 771 **See Field 8C**

AD-636 804 **See Field 20C**

AD-636 805 **See Field 20A**

AD-636 810 **See Field 13B**

AD-636 842 **See Field 13G**

AD-637 071 **See Field 20M**

AD-637 122 **See Field 7D**

N66-18129 **See Field 21B**

20E. MASERS AND LASERS

AD-458 027 **Field 20E, 20L**
CFSTI Price: HC$3.60
Korad Corp., Santa Monica, Calif.
SOLID STATE LASER AMPLIFIER.
Quarterly rept. no. 7, 1 Sep-30 Nov 64.
by A. H. Gillmer, J. H. Boyden, J. Free, H. Schultz, and R. C. Pastor. Feb 65, 34p
Contract DA-36-039-AMC-00070 (E)
Proj. DA-1P6-22001-A-056

Descriptors: (*Lasers, Ruby), Materials, Gain, Oscillators, Measurement, Pumping (Electronics), Mirrors, Light, Intensity, Rods, Curved profiles, Piezoelectric transducers, Interferometers, Kerr cells, Alignment, Beams (Electromagnetic), Reflectors, Yttrium, Oxides, Europium, Dielectric films, Crystals, Operation, Solid state physics.

Measurements were made to correlate the gain profile of ruby laser rods with optical quality and pumping light intensity. Curved mirror optical cavities were studied with regard to the production of spike free laser outputs. A feedback system with Pockels cell gain control was constructed and applied to a ruby laser. Development of a multigigawatt oscillator-amplifier system was completed. Y203:Eu ;3 was tested as a laser material with no success thus far. (Author)

AD-636 351 **Field 20E, 20J**
CFSTI Prices: HC$1.00 MF$0.50
Brandies Univ., Waltham, Mass. Dept. of Physics.
FUNDAMENTAL STUDIES OF THE COHERENCE PROPERTIES OF ELECTROMAGNETIC RADIATION.
Final rept., 1 Feb 63-30 Nov 65.
by D. L. Falkoff, and E. Lipworth. 28 Feb 66, 11p
Contract AF 19 (628)-2458
Projs. AF-4600, AF-4645
Tasks 460006, 464502
AFCRL-66-199

Descriptors: (*Electromagnetic waves, Lasers), (*Lasers, *Quantum mechanics), Ferromagnetic materials, Superconductors, Photoelectric cells (Semiconductor), Photons, Pumping (Optical), Helium group gases, Diffusion, Relaxation time.

Identifiers: Coherence theory.

Theoretical studies have been made of the quantum mechanical description of coherence in materials such as ferromagnets and superconductors and of electromagnetic radiation. In the latter studies, application has been made to effects of coherence and high power on photodetection. A practical result is that the photon echo measurement is shown to provide a sensitive detector of coherence. Experimental work has been carried out to determine the diffusion coefficients and spin depolarization cross sections of optically pumped alkali vapors in noble buffer gases. A method has been developed to measure the density of cesium vapor as a function of temperature. (Author)

AD-636 563 **Field 20E, 9E, 20J**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
PHASE AND AMPLITUDE FLUCTUATIONS OF THE LASER OSCILLATOR.
Revised ed.
by H. J. Pauwels. 28 Dec 65, 9p
Contract DA-36-039-AMC-03200 (E)
Revision of manuscript submitted 9 Aug 65.

Descriptors: (*Lasers, Noise), (*Oscillators, Lasers), Quantum mechanics, Mathematical models, Operators (Mathematics).

A quantum theory for noise in the steady state of the laser oscillator above threshold is presented. The concept of operator noise source is introduced. A simple laser model operating in a single mode with resonant frequency tuned to the center of the material line is considered. The resonance linewidth of the inverted material is collision-broadened, and assumed to be much broader than the cold-cavity width. Only one type of collision is considered. The quantum description of this laser model leads to onlinear operator equations. These are linearized, but this linearization is justified only for operation sufficiently above threshold. The first- and second-order Glauber functions and the expectation value of the field commutator are derived for the field inside the laser cavity. These results are compared with the predictions of a semiclassical theory in which the classical equations contain noise sources such that properties of the field below threshold are correctly predicted. Our results differ by certain terms from the results of this semiclassical theory. These terms are too small to have been detected experimentally. (Author)

AD-636 582 **Field 20E**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
ATOMIC BEAM PREPARATION TECHNIQUES FOR HYDROGEN MASER OPERATION WITH UNPOLARIZED ATOMS.
Technical rept.
by Harro G. Andersen, Edward Pannaci, and John F. Fulton. Jun 66, 36p ECOM-2720
Proj. DA-1L0-13001-A-91A
Task 11

Descriptors: (*Masers, *Atomic beams), Hydrogen, Resonance, Electron transitions, Atomic energy levels.

Hydrogen maser operation with unpolarized hydrogen atoms offers the advantage of a substantial insensitivity of hydrogen maser frequency against the resonance excitation of low frequency, Delta-mF = plus or minus 1 Zeeman transitions at low-magnetic fields. This feature is of particular importance for the application of the Zeeman transition linewidth quenching method for maser cavity tuning purposes. Various experimental techniques are described and analyzed, which can be used for the preparation of hydrogen atom ensembles populating the magnetic substates of the F = 1 level of the atomic hydrogen ground state, which do not possess a resulting polarization. The influence of these atomic beam preparation techniques on hydrogen maser amplitude are discussed. Both the saturation of atomic beam induced low frequency, Delta-mF = plus or minus 1 Zeeman transitions and a 90 degrees non-adiabatic magnetic field flop result in a vanishing hydrogen atom polarization, but deteriorate the maser amplitude considerably. A periodic switching between 0 and 180 degrees non-adiabatic magnetic field flop conditions, performed with a periodicity which is fast compared to the relaxation rates within the hydrogen maser storage bulb, results in an ensemble of hydrogen atoms with vanishing polarization and does not deteriorate the hydrogen maser oscillation characteristics. (Author)

AD-636 627 **Field 20E, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Hebrew Univ., Jerusalem (Israel). Microwave Div.
PHYSICS OF VIBRONIC TRANSITIONS IN THE SPECTRA OF RARE EARTH IONS IN CRYSTALS.
Final rept., 15 Nov 64-15 Nov 65.
by Saul Yatsiv, and William Low. May 66, 15p
Scientific-1
Grant AF-EOAR-39-65
AFCRL-66-520

Descriptors: (*Lasers, Rare earth elements), (*Rare earth elements, Line spectrum), (*Gadolinium compounds, Line spectrum), Nuclear magnetic resonance, Pumping (Optical), Ultraviolet radiation, Crystal lattices, Calcium compounds, Fluorides, Hydrogen, Spectra (Infrared), Israel.

Identifiers: Calcium fluoride, Vibronic lasers.

Enhancement of vibronic transitions with self-trapping of the parent resonance radiation was investigated in gadolinium compounds. Optical pumping of gadolinium was tried in several host lattices for obtaining a vibronic laser. The pumping efficiency was found to be considerably below the threshold. Vibronic spectra of gadolinium associated with adjacent H (-) ion in CaF2 were recently observed. The assignment of this transition and the correlation with the Infra-red absorption of the H (-) ion is discussed. (Author)

AD-636 642 **Field 20E, 9E**
CFSTI Prices: HC$3.00 MF$0.75
Electro-Optical Systems, Inc., Pasadena, Calif.
MOLECULAR TUNABLE AMPLIFIERS.

Interim rept., 1 Apr-30 Jun 60.
by A. Proudian, S. Schwarz, and I. Weiman. 15 Jul 60, 19p Scientific-1
Contract AD 33 (616)-7247
See also AD-614 584

Descriptors: (*Masers, Stark effect), (*Molecular electronics, *Amplifiers), (*Stark effect, Molecular electronics), Delay lines, Semiconductors, Doping, Electric fields, Silicon, Quantum mechanics, Tuning devices.

Effort has been directed toward the analysis of the proposed Stark effect tunable amplifier. The frequency range, power output, noise and Q have been derived from physical considerations and a series of experiments have been planned to determine device feasibility. Critical material parameters, such as relaxation time, impurity level density, and impurity spectra have been related to device performance. A series of experiments have been designed to measure the critical material parameters and determine device feasibility. The experimental design and equipment are described in detail. An analysis made of the delay line tunable amplifier indicates considerable promise for this over a broad frequency range. Material parameters are discussed along with the expected frequency and temperature performance. Construction and evaluation will be completed during the next quarter. (Author)

AD-636 727 **Field 20E**
CFSTI Prices: HC$4.00 MF$0.75
Army Electronics Command, Fort Monmouth, N. J.
BEHAVIOR OF HYDROGEN MASERS UNDER COHERENT LOW-FREQUENCY ZEEMAN TRANSITION EXCITATION.
Technical rept.
by Harro G. Andresen. Jun 66, 106p ECOM-2706
Proj. DA-1L0-13001-A-91A
Task 11

Descriptors: (*Masers, Excitation), (*Hydrogen, Masers), Line spectrum, Electron transitions, Frequency shift, Nuclear spins, Oscillation, Cavity resonators, Atomic energy levels.

Contents: Hydrogen maser frequency shifts due to coherently excited, low-frequency zeeman transitions; Hydrogen maser amplitude response due to coherently excited, low-frequency zeeman transitions; Spin-exchange effects on hydrogen maser amplitude response to low-frequency zeeman transitions; Oscillation characteristics for hydrogen maser operation with coherently excited, low-frequency zeeman transitions.

AD-636 790 **Field 20E, 20N, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Florence Univ. (Italy). Istituto di Onde Elettromagnetiche.
EXPERIMENTAL VERIFICATION OF FOX AND LI PATTERNS IN OPEN RESONATORS.
Interim rept.
by P. F. Checcacci, and A. M. Scheggi. Feb 66, 18p Scientific-3
Contract AF 61 (052)-871
AFCRL-66-496
See also AD-634 913.

Descriptors: (*Resonators, *Lasers), Italy, Resonance, X band, Microwaves, Distribution, Measurement, Mirrors, Interferometers, Difraction.

Identifiers: Fabry-Perot resonators.

An experiment with a microwave open resonator of the Fabry-Perot type is described. The field distribution of the fundamental mode has been accurately determined. A very good agreement has been found with the distributions computed by Fox and Li. It has been verified that flatness and alignment requirements are extremely critical and can explain the well known difficulty to obtain in practice the Fox and Li patterns. (Author)

AD-636 953 **Field 20E**
CFSTI Prices: HC$2.00 MF$0.50
Korad Corp., Santa Monica, Calif.
LASER-PUMPED LASER.
Final rept. 16 Apr 65-15 Apr 66.
by R. H. Hoskins, O. M. Cernichiari, B. McFarland, R. C. Pastor, and B. H. Soffer. Jul 66, 35p
Contract Nonr-4877 (00)
Proj. NR-015-625
Rept. on Proj. DEFENDER.

Descriptors: (*Lasers, *Pumping (Optical)), Fluorescence, Methylene blue, Phthalocyanines, Cinchona alkaloids, Molecular energy levels, Dyes, Synthesis (Chemistry), Optical properties, Absorption spectrum.

Identifiers: Defender project.

The objective of the program was to investigate an approach to high-powered lasers which would result in lower thresholds than Raman type lasers (thus avoiding stimulated Raman and Brillouin complications). No encouraging results were obtained from this laser-pumped laser scheme which included the investigation of a reasonable cross-section of materials -- quinine sulphate, phthalocyanine, and methylene blue, representing three different types of families of molecules. (Author)

AD-637 023 **Field 20E**
CFSTI Prices: HC$3.00 MF$0.75
Raytheon Co., Waltham, Mass. Research Div.
HIGH POWER GAS LASER RESEARCH.
Final technical rept., 15 Jun 65-14 Mar 66.
by F. Horrigan. 14 Mar 66. 88p
Contract DA-01-021-AMC-12427 (Z)

Descriptors: (*Lasers, Gases), (*Carbon dioxide, Lasers), (*Neon, Lasers), (*Helium, Lasers), Gas discharges, Power, Gas flow, Vapor pressure, Optical properties, Additives, Optical materials, Electrochemistry, Glow discharges, Spectroscopy.

The report discusses the investigation and optimization of a high-power high-efficiency CW gas laser utilizing a dc discharge excited, flowing mixture of carbon dioxide, nitrogen, and helium as the active laser medium. Continuous laser powers of 50 to 60 watts per meter length of active medium were obtained in well-collimated beams at various wavelengths in the neighborhood of 10.6 microns with an efficiency of more than 10 percent. The work involved optimization via variation of the parameters, i.e., gas flow rates, partial pressures of component, discharge current, optical coupling, additives, etc., as well as studies of: (1) optical materials suitable for 10 microns radiation of the relative merits of various optical coupling schemes; (2) the variations of single pass gain with the parameters; (3) the role of electrochemical effects; (4) the lifetimes of the laser level via direct afterglow investigation; (5) spectroscopy in both the visible and the infrared, and (6) Q-spoiling. A detailed picture of the operating principles of the CO2 laser is presented along with estimates of the ultimate powers (several watts per cc of active medium) and efficiencies (20 to 40%) obtainable and an indication of those aspects that are least understood and deserving of future effort. (Author)

AD-637 050 **Field 20E, 20F, 20C**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
CURRENT CHANGES DUE TO LASING ACTION.
by Alan Garscadden, and Samuel L. Adams. 11 Jan 66, 1p ARL-66-0086
Proj. AF-7073
Task 707303

Descriptors: (*Photoconductivity, *Gas discharges), (*Lasers, Photoconductivity), Helium, Neon, Excitation, Quantum mechanics.

Identifiers: Gas lasers.

The influence of laser action on the current through the gas discharge producing the action was first mentioned incidentally in another investigation. In a recent letter, Schiffner and Seifert have reported on the effect, confirming the result. They suggested that the increase in current when lasing does not occur is due to the additional cumulative ionization by electrons from the 3s or the 2s2 neon levels depending on the transition 6328 A or 11 523A. Data which give a more complete description of the effect are presented. (Author)

AD-637 098 **Field 20E, 20L**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
PROGRESS OF PHYSICAL SCIENCES: SELECTED ARTICLES.
by V. A. Zubov, M. M. Sushchinskii, and I. K. Shuvalov. 28 Feb 66, 5p FTD-MT-65-49
TT-66-62045
Edited machine trans. of Uspekhi Fizicheskikh Nauk (USSR) v83 n2 p197-222, 361-9 1964.

Descriptors: (*Lasers, Scattering), (*Low-temperature research, Symposia), Modulation, Light, Organic compounds, Excitation, Cryogenics, USSR.

Contents: Stimulated combination scattering of light, by V. A. Zubov, M. M. Sushchinskiy and I. K. Shuvalov; The Tenth All-Union Conference on Low Temperature Physics.

N66-18174 **Field 20E**
CFSTI Prices: HC$2.00 MF$0.50
Radio Corp. of America, Camden, N. J.
AN INVESTIGATION OF SUPERCONDUCTIVE TECHNIQUES FOR BROADBAND TRAVELING-WAVE MASERS.
Mar 66, 40p
Contract NAS5-3773
NASA-CR-386

Descriptors: *Traveling wave maser, *Broadband amplifier, *Magnetic coil, *Superconducting magnet.

For abstract, see T 66 18.

AD-636 346 **See Field 20M**

20F. OPTICS

AD-437 762 **Field 20F**
CFSTI Price: HC$2.60
RAND Corp., Santa Monica, Calif.
INVARIANT IMBEDDING AND SCATTERING OF LIGHT IN A ONE-DIMENSIONAL MEDIUM WITH A MOVING BOUNDARY.
by Richard Bellman, Robert Kalaba, and Sueo Ueno. Mar 64, 23p RM-3960-ARPA
Contract SD-79, ARPA Order-189-61
N64-19552

Descriptors: (*Integral equations, Scattering), (*Light, Scattering), Photons, Emission, Reflection, Absorption, Doppler effect, Astrophysics, Field theory.

It is shown how the invariant-imbedding technique is used for the derivation of integral equations governing the reflection and the transmission coefficients of radiation in a one-dimensional medium with a moving boundary. When formulating the source function, account is taken by the relaxation of photon emission under the assumption that during an elementary act of scattering a photon remains in a state of absorption for a certain duration of temporal capture. The Schuster problem for a moving one-dimensional medium is exactly treated. When formulating the transfer equations, the influence of the Doppler effect caused by the macroscopic differential motions is considered as a principal agency of the change of frequency on scattering. (Author)

AD-437 813 Field 20F
CFSTI Price: HC$2.60
RAND Corp., Santa Monica, Calif.
INVARIANT IMBEDDING AND A RESOLVENT OF THE PHOTON-DIFFUSION EQUATION.
by Richard Bellman, Robert Kalaba, and Sueo Ueno. Mar 64, 25p RM-3937-ARPA
Contract SD-79, ARPA Order-189-61
N64-19 551

Descriptors: (*Electromagnetic waves, Propagation), (*Photons, Diffusion), (*Diffusion, Equations), Particles, Statistical mechanics, Analysis, Geometry, Integral equations, Intensity, Reflection, Light, Scattering, Atmosphere, Differential equations, Isotropism.

In the study of radiative transfer, the classical Boltzmann-type approach focuses attention on the statistical behavior of the particles within the medium. There are, however, analytical and computational advantages in the invariant-imbedding approach, which leads to the determination of the diffusely reflected and transmitted intensities in slab geometry. In the present paper it is shown that the invariant-imbedding technique is also extremely useful for the study of the internal intensity of raiation in a finite, homogeneous, flat layer. In other words, the technique provides us directly with a complete solution of scattering problems of light in a finite plane-parallel atmosphere. (Author)

AD-468 937 Field 20F
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
CALCULATION OF OPTICAL TRANSFER FUNCTIONS FROM LENS DESIGN DATA.
Technical rept.
by A. C. Marchant, and Margaret Lello. Feb 65, 40p TR-65031

Descriptors: (*Lenses, Design), Programming (Computers), Diffraction, Graphics, Mathematical analysis, Functions.

This report describes the basic theory and the method of operation of a computer program developed at Imperial College, London, for calculating the optical transfer function of a lens system. The program determines the wavefront aberration, and the shape of the exit pupil (vignetted or otherwise) and uses this information to derive the transfer function in any image plane and at any field angle. Typical results, for a modern aerial reconnaissance lens, are given and compared with measurement. (Author)

AD-636 381 Field 20F, 9E
CFSTI Prices: HC$2.00 MF$0.50
California Inst. of Tech., Pasadena.
THEORY OF THE OPTICAL PARAMETRIC OSCILLATOR.
Technical rept.
by Amnon Yariv, and W. H. Louisell. Apr 66, 28p TR-4
Contract AF 33 (615)-2800
Prepared in cooperation with Bell Telephone Labs., Inc., Murray Hill, N. J. Prepared for presentation at the International Conference on Quantum Electronics (3rd) at Pheonix, Ariz., Apr 1966.

Descriptors: (*Optical equipment, *Crystal oscillators), Theory, Resonators, Microwave oscillators, Field theory.

Identifiers: Parametric oscillators, Quantum electronics.

A formalism for describing optical parametric oscillation is developed. The theory is applied to deriving the oscillation threshold condition, power output, the Manley-Rowe conditions, index matching and frequency tuning. (Author)

AD-636 382 Field 20F, 20H
CFSTI Prices: HC$3.00 MF$0.50
Parke Mathematical Labs., Inc., Carlisle, Mass.
THE AFCRL MOSSBAUER EFFECT CONSTANT VELOCITY SPECTROMETER.
Interim rept.
by W. Williams. May 66, 55p Scientific-3
Contract AF 19 (628)-4790
Proj. AF-4608
Task 460805
AFCRL-66-450

Descriptors: (*Mossbauer effect, *Spectrum analyzers), Solid state physics, Garnet, Spectroscopy.

This report describes the Mossbauer Effect constant velocity spectrometer currently being employed by the Solid State Sciences Laboratory (CRW) at AFCRL in studies of solid materials. The main body of the text contains a general discussion of the spectrometer, vibration and background considerations and a qualitative analysis of one of the preliminary garnet spectra; the three appendices detail the electrical switching network, scalar control and multi-channel analysis of velocity fluctuations, and the constant velocity drive unit. (Author)

AD-636 383 Field 20F, 20J
Rochester Univ., N. Y. Dept. of Physics and Astronomy.
CONFIGURATION SPACE PHOTON NUMBER OPERATORS IN QUANTUM OPTICS.
Interim rept.
by Leonard Mandel. 22 Dec 65, 12p Scientific-2
Contract AF 19 (628)-5052
Proj. AF-4645
Task 464502
AFCRL-66-396
Revision of manuscript submitted 8 Nov 65.

Descriptors: (*Photons, *Quantum mechanics), (*Optics, Quantum mechanics), Operators (Mathematics), Field theory, Photoelectric effect.

Some properties of the operator n sub v, t representing the number of photons localized in a finite volume V at time t are investigated. To some extent these properties reflect the well-known difficulty of localizing photons in space-time. However, it is shown that, when the linear dimensions of V are large compared with the wave-length of any occupied mode of the field, the n sub v, t operator acquires some simple properties. The commutator of n sub v, t and the detection operator A (x,t) is expressible in an interesting form. The commutator and relations derived from it become particularly simple for certain space-time regions which we label conjoint and disjoint. An orthogonal set of eigenstates of n sub v, t is found, together with the corresponding eigenvalues, and it is shown that an arbitrary state is expressible in terms of these eigenstates. Some Nth-order correlations of the n sub v, t operators are evaluated, and the results are used to calculate the probability distribution of eigenvalues of sub v, t for an arbitrary state of the field. (Author)

AD-636 499 Field 20F, 7D
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
PERFORMANCE CAPABILITIES OF SMALL GRATING SPECTROMETERS.
Interim rept.
by R. E. Kagarise. 27 May 66, 13p NRL-6393
Proj. RR-001-01-43-4803

Descriptors: (*Infrared spectrophotometers, Performance (Engineering)), Absorption spectrum, Diffraction gratings, Infrared spectroscopy, Isotopes, Methane, Chlorides.

Identifiers: Methyl chloride.

Some of the performance capabilities of grating infrared spectrometers, such as spectral resolving power, wave-number accuracy, analytical sensitivity and accuracy, and qualitative specificity, are demonstrated. Primary emphasis is given to resolving power and wave-number accuracy. The nu sub 3 fundamental of CH3C1 was studied in the gas phase, and the rotational fine structure was analyzed. A spectral resolution of better than 0.25/cm and a line position accuracy of about plus or minus 0.04/cm were attained. Several rotational constants were determined for CH3C1 (35) and CH3C1 (37), and these agree well with those previously determined from microwave data. The nu sub 3 and nu sub 4 fundamentals of CH4 were examined in the gas phase with various degrees of resolution, using both prism and grating instruments. With the increased resolution of the grating instruments, striking increases in the peak absorptivities of the rotational lines occur, and many previously unresolved lines appear. This increased resolution gives more specific spectra, leading to greater certainty in the identification of unknowns. Substantial improvements in limits of detectability for simple molecules result, and these molecules can be more certainly identified in mixtures because their rotational spectra can be resolved. (Author)

AD-636 617 Field 20F, 5J, 6P
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
TRICHROMATIC SPECIFICATIONS OF THE MUNSELL 100 HUES AT 5/5 FOR ILLUMINANT A.
by Hermann von Schelling, and Dean Farnsworth. 15 Apr 49, 10p 144, Color Vision-20
NAVMED-NM-011-019

Descriptors: (*Colors, Specifications), Colorimetry, Chromatographic analysis, Illumination, Color vision.

The series of painted papers known as the Munsell 100-Hues at 5/5, production numbers 101 to 200, were made on the basis of the Atlas system in which the reflectance followed the reflectance followed the square of the value. They were originally intended to be used as standards within the Munsell Laboratory and no general sale or distribution was anticipated. The supply of the original papers is now completely exhausted. However, the series was, and remains, the most exact circuit of closely spaced colors in psychological intervals which has ever been produced. It became invaluable for certain types of visual studies and a number of laboratory researches now inprogress are based upon their colorimetric properties. In addition, the series was made the basis (by selection and replacement) of the Farnsworth-Munsell 100 Hue test which has been used for research and examining purposes in several hundred industries. (Author)

AD-637 064 Field 20F
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
LIGHT TRANSMITTING CABLES.
by K. Y. Kung. 23 May 66, 7p FTD-TT-65-725
TT-66-62037
Edited trans. of K'o Hsueh Ta Chung (Chinese People's Republic) n12 p5 1963.

Descriptors: (*Fiber optics, Glass), China, Light transmission, Refractive index, Reflection.

A light cable is composed of two parts, the fiber center and the thin glass housing. The fiber is made of material of higher refractive index, and the housing of lower refractive index. The housing serves to protect the surface of each individual fiber so that it remains smooth and clean. It also separates one fiber from another in the cable. The main function of the housing is, however, to provide an outside layer of a lower refractive index on the fiber so that the phenomenon of total reflection is produced when a light beams enters a single light fiber. In this way, light can be transmitted through a curved and soft light cable.

N66-11757 **Field 20F**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
COMPUTATIONAL RESULTS FOR DIFFUSE TRANSMISSION AND REFLECTION FOR HOMOGENOUS FINITE SLABS WITH ISOTROPIC SCATTERING.
by R. Bellman, H. Kagiwada, R. Kalaba, and S. Ueno. Oct 65, 35p RM-4775-NASA
Contract NASR-21 (07)
NASA-CR-67953

Descriptors: *Reflection coefficient, *Slab, *Radiation transfer, *Scattering, *Transmission.

For abstract, see T 66 18.

N66-14201 **Field 20F**
CFSTI Prices: HC$6.00 MF$1.50
Goodyear Aerospace Corp., Akron, Ohio.
A STUDY OF WIDE ANGLE OPTICAL SYSTEMS FOR USE IN VISUAL SIMULATIONS.
Final rept. 29 Dec 64 - 29 Jun 65.
26 Jul 65, 287p GER-12103-S/4
Contract NAS8-11775
NASA-CR-62022

Descriptors: *Optical equipment, *Display system.

N66-17227 **Field 20F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
POLARIZATION OF THE INCIDENT BEAM IN NON-NORMAL REFLECTANCE MEASUREMENTS.
by J. K. Coulter. Sep 65, 21p NASA-TM-X-55369, X-713-65-353

Descriptors: *Incident ray, *Reflection coefficient, *Light, *Polarization.

N66-18320 **Field 20F**
CFSTI Prices: HC$3.00 MF$0.75
IIT Research Inst., Chicago, Ill. Analytical Chemistry Research.
DESIGN, DEVELOPMENT, AND FABRICATION OF A PORTABLE SPECTROMETER-TYPE MONITOR.
Technical summary rept, 29 Jun 64-31 Jan 66.
by E. L. Grove. 21 Jan 66, 91p IITRI-V6010-18
Contract NAS8-11723
NASA-CR-70584

Descriptors: *Arc welding, *Gas spectroscopy, *Spectrometer, *Tungsten inert gas (TIG) welding.

N66-18411 **Field 20F**
CFSTI Prices: HC$3.00 MF$0.75
Beckman Instruments, Inc., Fullerton, Calif. Advanced Technology Operations.
STUDY OF THE FEASIBILITY AND DESIGN OF AN ULTRAVIOLET DENSITY SENSOR CALIBRATION FIXTURE.
Final rept.
by E. E. Miller. 26 Jul 65, 90p
Contract NAS4-855
NASA-CR-70630

Descriptors: *Atmospheric density, *Calibrator, *Mathematical model, *Ultraviolet reflection, *Structural design.

N66-18431 **Field 20F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A DOUBLE-FOCUSING MAGNETIC MASS SPECTROMETER FOR SATELLITE USE.
by L. G. Hall, and C. A. Reber. Mar 66, 24p
NASA-TN-D-3211

Descriptors: *Gas spectroscopy, *Magnetic spectroscopy, *Explorer XVII satellite, *Mass spectrometer, *Satellite instrumentation.

AD-636 414 **See Field 6P**

AD-636 442 **See Field 11F**

AD-636 447 **See Field 17H**

AD-636 772 **See Field 9E**

AD-636 777 **See Field 20L**

AD-636 807 **See Field 9A**

AD-636 969 **See Field 17B**

AD-636 983 **See Field 4A**

AD-637 050 **See Field 20E**

AD-637 057 **See Field 20I**

20G. PARTICLE ACCELERATORS

AD-636 708 **Field 20G**
Nevis Labs., Columbia Univ., Irvington-on-Hudson, N. Y.
INCREASING SYNCHROCYCLOTRON CURRENTS AND THE SPACE CHARGE LIMIT.
by James Rainwater. 14 Jun 65, 8p R-509
Contract Nonr-266 (72)

Descriptors: (*Synchrocyclotrons, *Space charges), Electron beams, Cyclotrons, Electric currents, Equations.

Until MacKenzie recently emphasized the dominating role of space charge beam blowup at small radii in synchrocyclotrons, the importance of this factor was not appreciated. Much largely futile effort had been expended on attempts to increase average beam currents by improving other factors. Lawson's extension of MacKenzie's treatment for ordinary cyclotrons is considered in more detail, with numerical examples and a detailed discussion of the extension of the theory to synchrocyclotrons. In addition, a simpler semi-empirical formula is obtained which gives a good match to existing currents in all present synchrocyclotrons. Current gains up to a factor of approx. 100 should be feasible, and a discussion is given as to how such an improvement might be gained by modifications of existing synchrocyclotrons. (Author)

AD-637 068 **Field 20G**
CFSTI Prices: HC$7.50 MF$2.00
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THEORY AND DESIGN OF LINEAR ACCELERATORS: COLLECTION OF ARTICLES.
28 Feb 66, 450p FTD-MT-64-180
TT-66-62041
Edited machine trans. of mono. Teoriya i Raschet Lineinykh Uskoriteley; Sbornik Statei, Moscow, 1962 p1-348.

Descriptors: (*Linear accelerators, Design), Charged particles, Proton accelerators, Electron accelerators, Synchrotrons, Proton beams, Electron beams, Ion accelerators, Waveguides, Plasma physics, USSR.

The collection includes works on the theory and design of linear accelerators which were carried out at the Physical and Technical Institute of Academy of Sciences of Ukrainian SSR in 1947-1956. These works investigate basic questions of the dynamics of accelerated particles, different accelerating systems, comparative analysis of them, design of the most effective systems. It was on the basis of these works that the proton and electron accelerators built and presently being built at the Physical and Technical Institute of Academy of Sciences of Ukrainian SSR were designed. (Author)

ORNL-3940 **Field 20G, 20H**
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn.
ELECTRONUCLEAR DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING DECEMBER 31, 1965.
May 66, 124p
Contract W-7405-eng-26

Descriptors: (*Nuclear physics, Reviews), (*Particle accelerators, Reviews).

For abstract, see N 20 16.

CONF-651109 **See Field 6R**

20H. PARTICLE PHYSICS

AD-636 533 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa.
THEORY OF ELECTRON COLLISION EXPERIMENTS AT INTERMEDIATE AND HIGH GAS DENSITIES.
Technical rept.
by P. J. Chantry, A. V. Phelps, and G. J. Schulz. 29 Apr 66, 79p TR-32, 66-9E3-113-P1
Contract Nonr-2584 (00), ARPA Order-125-63
Proj. 4720

Descriptors: (*Electron beams, Scattering), Elastic scattering, Inelastic scattering, Diffusion, High-pressure research, Mass spectrum, Theory, Probability.

By means of a two stream approximation an analytical solution is obtained to the equation of transfer governing the steady state concentration of monoenergetic electrons within a slab of gas bounded by two infinite planes, one of which emits a constant current density normal to its surface. The theory places no restriction on the gas pressure and includes the effects of inelastic collisions and partial reflection of scattered electrons at one or both boundaries. The results are applied to electron beam experiments at intermediate and high pressures where the mean free path of electrons is comparable to or less than the length of the collision chamber. Analytical expressions are obtained for the electron current transmitted through the gas and for the normalized ion currents to be expected in the case of total ion collection and in the case of sampling through a slit. The effect of elastic and inelastic collisions may be represented by an 'equivalent length factor' which modifies the equations normally applicable under low pressure conditions. The results of the present theory are compared with previous theories with particular reference to their use in interpreting experiments of the Maier-Leibnitz type, designed to measure absolute values of inelastic collision cross sections. (Author)

AD-636 763 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Dept. of Physics.
S WAVE PSEUDOSCALAR MESON BARYON SCATTERING IN A SIMPLE MODEL WITH BROKEN SU (3) SYMMETRY.
by H. W. Wyld Jr. 1965, 47p
Contract Nonr-1834 (05), Grant NSF-GP-5622

Descriptors: (*Meson reactions, *Nuclear scattering), (*Baryons, Nuclear scattering), K mesons, Antiparticles, Nucleons, Sigma hyperons, Groups (Mathematics), Nuclear resonance, Nuclear energy levels.

Identifiers: Symmetry (Quantum mechanics).

A model of S wave pseudoscalar meson baryon scattering is studied in which the force is due to vector meson exchange. The potential is approximated by a static Yukawa potential and the kinematics is simplified. The actual physical masses of the particles are used so that SU (3) symmetry is broken. The resulting problem reduces to a set of coupled channel Schrodinger equations which

are solved exactly on a computer. The K matrix and the eigenphases are calculated. Several examples of virtual bound state resonances are found. The model yields a Yo* (1405) as a virtual bound state of anti-KN and N* (1510) as a virtual bound state of K Sigma. (Author)

AD-636 785 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana. Dept. of Physics.
A REGGE POLE ANALYSIS OF PION-PROTON CHARGE EXCHANGE POLARIZATION.
by Robert K. Logan, and Luigi Sertorio. 1966, 11p
Contract Nonr-1834 (05)

Descriptors: (*Meson reactions, Polarization), (*Pions, Nuclear reactions), (*Protons, Nuclear reactions), Nuclear cross sections, Nuclear spins, Neutrons, Electrostatics.

Identifiers: Regge poles, RHO mesons.

The negative-pion-proton charge exchange reaction negative-pion + p to neutral-pion + n at high energy and low momentum transfer provides an excellent test of the Regge pole hypothesis. Only the RHO-meson may be exchanged in the crossed channel, t, because only the RHO-meson has I = 1, G = + 1 and P = (-1) exp. J. The differential cross section d (sigma)/d (t) was measured in the energy range 6 - 18 GeV. Several analyses have shown the consistency of this data with a single RHO Regge pole exchange. The single Regge pole model predicts zero polarization because the non-spin flip and the spin flip amplitudes have the same phase. A recent measurement at 6 GeV and low momentum transfer shows a non-zero polarization in apparent contradiction to the Regge pole hypothesis. It is demonstrated that this polarization may be explained in terms of the interference of the Regge pole amplitude with the lower lying resonance in the direct channel, s. Predictions of P for various values of s and t are made. (Author)

AD-637 003 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
SLOWING DOWN OF ATOMIC PARTICLES BY ELASTIC SCATTERING.
by R. K. Landshoff. May 66, 14p Rept. no. 2-12-66-1
Contract Nonr-3368 (00)
Proj. NR-087-133

Descriptors: (*Nuclear particles, *Elastic scattering), Nuclear cross sections, Nuclear scattering, Transport properties, Atomic properties, Potential theory.

A reevaluation was made of the differential cross section and the transport cross section for particles interacting with a screened Coulomb potential. The results lie roughly between the earlier ones obtained by Firsov and by Lindhard et al. Experimental data by Lasson et al. lead to lower cross sections especially at low energies. This can probably be ascribed to a failure of the model potential which extends to larger interparticle distances than it should. (Author)

BNL-947 **Field 20H, 18K**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
NEUTRON THERMALIZATION AND DIFFUSION IN NONISOTHERMAL MEDIA.
by Bal Raj Sehgal. Oct 65, 12p
Contract AT (30-2)-GEN-16

Descriptors: (*Thermal neutrons, Diffusion), (*Reactor moderators, Scattering).

For abstract, see N 20 16.

N66-10543 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Laboratoire de Physique Theorique et des Hautes Energies, Orsay (France).
THE OFF-SHELL STRUCTURE OF THE PARTIAL T-MATRIX IN POTENTIAL SCATTERING.
by J. Y. Guennegues. Sep 65, 27p TH/108

Descriptors: *Matrix algebra, *Nuclear structure, *Schroedinger equation, *Scattering matrix.

N66-10597 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Comitato Nazionale per l Energia Nucleare, Frascati (Italy).
ADONE. THE FRASCATI 1.5 GE V ELECTRON POSITRON STORAGE RING.
30 Aug 65, 11p LNF-65/26

Descriptors: *Positron, *Electron, *Storage device.

N66-10598 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Nihon Daicaku, Tokyo (Japan). Dept. of Physics.
UNIFICATION OF TWO-BODY INTERACTION OF NONLEPTONIC DECAY AND MASS-SPLITTINGS ON THE BASIS OF CABIBBO SPACE INVARIANCE.
by S. Y. Furui, M. Imoto, and S. Kawasaki. 1965, 6p NUP-65-12

Descriptors: *Hamiltonian, *Nuclear physics, *Particle decay, *Lepton, *Tensor analysis.

N66-11755 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Avco-Everett Research Lab., Everett, Mass.
A LIMIT ON STABLY TRAPPED PARTICLE FLUXES.
by C. F. Kennel, and H. E. Petschek. Jul 65, 64p
Avco-everett RR-219
Contracts NASw-837, Nonr-2524 (00)
NASA-CR-67944

Descriptors: *Electron precipitation, *Particle flux, *Trapped particle, *Ion cyclotron, *Whistler.

N66-11762 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Yeshiva Univ., New York.
THE APPLICATION OF STATISTICAL MECHANICS OF NONEQUILIBRIUM PROCESSES TO ASTROPHYSICS AND THE DETERMINATION OF GALACTIC MASS DISTRIBUTION AND GRAVITATIONAL POTENTIAL.
Final rept.
by L. F. Landovitz. 1965, 16p
Grant NsG-227
NASA-CR-67994

Descriptors: *Astrophysics, *Gravitational potential, *Mass distribution, *Nonequilibrium, *Statistical mechanics.

N66-13119 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
LITHIUM-INDUCED REACTIONS AND THE STRUCTURE OF LIGHT NUCLEI.
by L. Rotter. 1965, 17p JINR-E-2243

Descriptors: *Deuteron, *Lithium, *Nuclear reaction.

N66-13136 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
DETERMINATION OF PARITY IN REACTIONS INDUCED BY GAMMA QUANTA.
by S. M. Bilenkii, and R. M. Ryndin. 8 Jul 65, 7p JINR-E-2259

Descriptors: *Gamma radiation, *Parity.

N66-14612 **Field 20H**
CFSTI Prices: HC$4.00 MF$1.00
Dublin Inst. for Advanced Studies (Eire).
INTRODUCTION TO THE GROUP THEORY OF ELEMENTARY PARTICLES.
by J. McConnell. 1965, 124p

Descriptors: *Elementary particle, *Group theory, *Lie group, *Quantum mechanics.

N66-15447 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Engineering and Science.
RADIATION DAMAGE - ELECTRON IMPACT.
by D. E. Kraus, and F. A. White. Sep 65, 87p
Grant NsG-371
NASA-CR-69381

Descriptors: *Ion impact, *Recoil ion, *High energy electron, *Measuring apparatus.

N66-15458 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
The Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
THE KINETIC PROPERTIES OF THE GALACTIC COSMIC RAY GAS.
by E. N. Parker. 1965, 18p EFINS-65-103
Grant NsG-96-60
NASA-CR-69378

Descriptors: *Cosmic ray, *Isotropic medium, *Sound velocity, *Pressure.

N66-15676 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Nuclear Energy Commission, Sacavem (Portucal). Lab. of Physics and Nuclear Engineering.
ANGULAR CORRELATION STUDIES FOR THE C12/ HE3, ALPHA GAMMA/ C11, C12/ HE3, P GAMMA/ N14, AND O18/P ALPHA GAMMA/ N15 REACTIONS.
by J. S. Lopes, R. W. Ollerhead, A. R. Poletti, M. F. Thomas, and E. K. Warburton. 1964, 49p
LFEN-31 (Beta)

Descriptors: *Angular correlation, *Helium 3, *Proton, *Alpha particle, *Carbon, *Oxygen 18.

N66-15677 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Nuclear Energy Commission, Sacavem (Portucal). Lab. of Physics and Nuclear Engineering.
ANGULAR CORRELATION MEASUREMENTS IN THE O18 (P,P' GAMMA) O18 REACTION.
by J. S. Lopes, R. W. Ollerhead, A. R. Poletti, M. F. Thomas, and E. K. Warburton. 1964, 34p
LFEN-28 (Beta)

Descriptors: *Gamma radiation, *Proton, *Angular correlation, *Oxygen 18.

N66-15886 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.50
Kyoto Univ. (Japan). Research Inst. for Fundamental Physics.
PROTON-PROTON INTERACTION IN THE GE V REGION.
by Y. Hama. Nov 65, 54p RIFP-49

Descriptors: *Elastic scattering, *Proton-Proton reaction.

N66-15962 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Lab. Di Fisica.
THE TWO CHANNEL PROBLEM AND THE INELASTIC URITARITY CONDITION IN EIGENSTATES OF THE TOTAL ANGULAR MOMENTUM.

by U. Amaldi Jr, R. Biancastelli, and S. Francaviglia. 10 May 65, 29p ISS-65/14

Descriptors: Angular momentum, *Quantum mechanics, *Unitarity.

N66-16405 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Schellenger Research Labs., Texas Western Coll., El Paso.
ANALYSIS OF DESIGN CRITERIA FOR A RADIO FREQUENCY PROTON EVENT WARNING SYSTEM OPERATING IN THE FREQUENCY RANGE 1000-3750 MEGACYCLES PER SECOND.
by M. D. McAnally, and A. Shlanta. Sep 65, 50p
Grant NGR-44-020-001
NASA-CR-69853

Descriptors: *Systems design, *Warning device, *Proton protuberance, *Statistical analysis.

N66-16457 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
California Inst. of Tech., Pasadena.
NON-RESONANT NUCLEAR REACTIONS AT STELLAR TEMPERATURES.
by J. N. Bahcall. 21 Jun 65, 10p
Contract NONR-220 (47), Grant NGR-05-002-0028
NASA-CR-69866

Descriptors: *Nuclear reaction, *Star, *Stellar structure.

N66-16716 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
State Univ. of Iowa, Iowa City. Dept. of Physics and Astronomy.
OBSERVATION OF APPROXIMATELY 500 KE V PROTONS IN INTERPLANETARY SPACE WITH MARINER IV.
by S. M. Krimigis, and J. A. Van Allen. Dec 65, 18p Rept. no. 65-45
Grant NsG-233
NASA-CR-70022

Descriptors: *Mariner IV space probe, *Particle detector, *Proton energy.

N66-17238 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE MULTIPLY-CHARGED PRIMARY COSMIC RADIATION AT SOLAR MINIMUM, 1965.
by V. K. Balasubrahmanyan, D. E. Hagge, G. H. Ludwig, and F. B. McDonald. Nov 65, 30p
NASA-TM-X-55403, X-611-65-480

Descriptors: *Primary cosmic radiation, *Charged particle, *Energy spectrum, *Solar effect.

N66-17403 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Aktiebolaget Atomenergi, Stockholm (Sweden).
MEASUREMENT OF THE NEUTRON SLOWING-DOWN TIME DISTRIBUTION AT 1.46 E V AND ITS SPACE DEPENDENCE IN WATER.
by E. Moller. Dec 65, 34p AE-208

Descriptors: *Slow neutron, *Space-time function, *Time dependency, *Water.

N66-17689 **Field 20H**
CFSTI Prices: HC$1.00 MF$1.50
Laboratoire de Physique Theorique et Hautes Energies, Orsay (France).
NON-LEPTONIC DECAY IN A QUARK MODEL.
by M. K. Gaillard. Jan 66, 10p TH/126

Descriptors: *Baryon, *Elementary particle, *Group theory, *Meson, *Theoretical physics.

N66-17741 **Field 20H**
CFSTI Prices: HC$6.00 MF$1.50
Ling-Temco-Vought, Inc., Dallas, Tex. Liv Astronautics Div.
SOLAR ACTIVITY CATALOGUE. VOLUME 4. CATALOGUE OF SOLAR ACTIVITY DURING 1959.
by H. DODSON-Prince, E. R. Hedeman, and F. C. Jonah. 8 Jun 65, 265p Rept. no. 00.650
Contract NAS9-2469
NASA-CR-65220

Descriptors: *Balloon flight, *Geomagnetic storm, *Solar activity, *Sunspot.

ORNL-3786 **Field 20H**
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
EFFECT OF ERROR ON RESULTS OF A LOW-ENERGY INTRANUCLEAR CASCADE CALCULATION.
by Hugo W. Bertini. Jun 66, 188p
Contract W-7405-eng-26

Descriptors: (*Nuclear reactions, Mathematical analysis).

For abstract, see N 20 16.

WASH-1068 **Field 20H, 18K**
CFSTI Prices: HC$6.00 MF$1.25
Los Alamos Scientific Lab., N. Mex.
REPORTS TO THE AEC NUCLEAR CROSS SECTIONS ADVISORY GROUP MEETING HELD AT WASHINGTON, D. C., MARCH 24-25, 1966.
by H. T. Motz. 1966, 233p EANDC (US-85U, INDC (US)-3U
Contract W-7405-eng-36

Descriptors: (*Nuclear cross sections, Reports), (*Nuclear physics, Nuclear cross sections).

For abstract, see N 20 16.

AD-636 340 **See Field 20L**

AD-636 382 **See Field 20F**

AD-636 542 **See Field 18K**

AD-636 548 **See Field 20J**

AD-636 568 **See Field 4A**

AD-636 598 **See Field 20C**

AD-636 646 **See Field 6R**

AD-636 647 **See Field 6R**

AD-636 652 **See Field 6R**

AD-636 780 **See Field 18D**

AD-637 125 **See Field 18F**

ORNL-3940 **See Field 20G**

SC-R-66-885 **See Field 7D**

20I. PLASMA PHYSICS

AD-443 406 **Field 20I**
CFSTI Price: HC$2.60
RAND Corp., Santa Monica, Calif.
THE TERRESTRIAL RING CURRENT.
by Ernest C. Ray. Jul 64, 22p P-2939
N64-30 744

Descriptors: (*Plasma physics, Magnetic fields), Axially symmetric flow, Integral equations, Partial differential equations, Polynomials, Terrestrial magnetism.

Several people have computed numerically the magnetic field caused by an axially symmetric body of plasma imbedded in a dipole magnetic field. In the present paper we derive an approximate formula for this magnetic field, without first choosing a particular functional form for the plasma density. This has the consequence that any particular case can be easily discussed without recourse to a computer, whereas previous treatments resulted in a tabulation of an answer for a particular case only, and new cases requires new computer runs. The method used avoids the usual fine net required by the singularity in the integrand. This is achieved by constructing a new quadrature formula which treats this singularity exactly. The then permitted coarse net makes possible an algebraic treatment rather than a numerical one. (Author)

AD-636 543 **Field 20I**
Rochester Univ., N. Y. Dept. of Physics and Astronomy.
MEASUREMENT OF PHOTON BUNCHING IN A THERMAL LIGHT BEAM.
by B. L. Morgan, and L. Mandel. 21 Apr 66, 9p Scientific-3
Contract AF 19 (628)-5052
Proj. AF-4645
Task 464502
AFCRL-66-425
Prepared in cooperation with Imperial Coll. of Science and Technology, London (England). Dept. of Physics.

Descriptors: (*Photons, Measurement), Photoelectric effect, Gas discharges, Photomultipliers, Light, Counting methods, Great Britain.

An experiment is described in which the interval distribution of photoelectric counts is examined, under conditions where light from a low pressure Hg198 gas discharge falls on a photomultiplier. The rate of two-photon counting is measured when the interval lies within the range tau-1 and tau-1 +7.5 nsec, and it is shown that the two-photon counting rate exceeds the corresponding rate for random pulses when tau-1 approx. < 3 nsec. The measurements yield information on the spectral profile of the light, which is shown to be non-Lorentzian and to have a width somewhat greater than 200 Mc/sec. (Author)

AD-636 608 **Field 20I, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A METHOD OF DETERMINING ELECTRON DENSITY DISTRIBUTION IN A PLASMA.
by L. A. Dushin, V. I. Kononenko, and A. I. Skibenko. 21 Feb 66, 4p FTD-TT-65-748
Unedited rough draft trans. Patent (USSR) 167 524, appl. no. 896343/26-25 16 Oct 61.

Descriptors: (*Plasma medium, Electron density), Patents, Measurement, Microwaves, Attenuation, USSR.

The object of the invention is a method of determining the distribution of electron density in a plasma by measuring the amplitude of a signal that has passed through it. The function of spacial distribution of electrons in a wide range of densities is determined by measuring the magnitude of damping of the amplitudes of microwave signals of several different frequencies that are selected so that at the moment a signal of one frequency is cut off the amplitude of one of the remaining signals experiences damping. (Author)

AD-636 720 **Field 20I, 12A, 20D**
CFSTI Prices: HC$3.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Applied Mathematics.
THE BOUNDARY VALUE PROBLEM IN COMPRESSIBLE MAGNETO-HYDRODYNAMICS.
Technical rept.
by Eric P. Salathe, and Lawrence Sirovich. Jul 66, 53p TR-6, Nonr-562 (39)/6
Contract Nonr-562 (39)
Proj. NR-061-157

Descriptors: (*Magnetohydrodynamics, *Boundary value problems), Two-dimensional flow, Compressible flow, Airfoils, Theory.

Linearized steady two-dimensional compressible magnetodydrodynamics is considered. No restriction on the gas law or on the field orientations is made. Thin body flow problems are solved for all flow field regimes (e.g. doubly hyperbolic, hyperliptic). The method of solution is based on replacing material walls by surfaces of discontinuity. The discontinuous forms of magnetohydrodynamic equations are derived in full generality. It is then shown that the solution to any problem may be represented in terms of the fundamental solution. The latter is obtained in closed form for all regimes. The final solution is then reduced to a single integral equation which may be solved in all cases. (Author)

AD-636 935 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
SOME PROPERTIES OF A SHORT ARC IN CESIUM VAPOR.
by Yu. P. Korchevii, and V. D. Semichaevskii.
Jun 66, 11p
Contract DA-44-009-AMC-1563 (T)
Proj. DA-1M624201D466
ERDL-T-1857-66, TT-66-62023
Pro Deiaki Osoblivosti Korotkoi Dugi V Parakh Zesiyu. trans. from Ukrayinskyi Fizychnyi Zhurnal (USSR), v11 p177-82 1966.

Descriptors: (*Plasma medium, Cesium), (*Gas discharges, Cesium), (*Electric arcs, Physical properties), Vapors, Electrodes, Cathodes, Tungsten, Anodes, Films, Glow discharges, Gas ionization, USSR.

The study deals with the gradual development of an arc-type discharge in cesium vapor in a short diode with an interelectrode space of 1.9 cm and an incandescent tungsten cathode. The probe procedure is used to define the interelectrode distribution of the plasma parameters for the three successive forms of its existence: (1) with a luminous film on the anode, (2) with a luminous sphere, and (3) with a cathode glow. It appears that the properties of such a discharge depend to a considerable extent on the point of generation of positive ions in the narrow interelectrode space. (Author)

AD-636 956 **Field 20I, 9E**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
INVESTIGATION OF PLASMA GENERATORS FOR MICROWAVE DEVICES.
Technical rept.
by Maurice Weiner, Robert M. True, and Edward V. Edwards. Jun 66, 48p ECOM-2704
Proj. DA-1L0-13001-A-91A
Task 1L0-13001-A-91A-26-00

Descriptors: (*Plasma generators, Microwave equipment), Ionization gages, Electron density, Temperature, Voltage, Microwave amplifiers, Millimeter waves, Noise generators, Plasma physics.

An experimental study on the Penning Ionization Gauge (PIG) discharge and ion emission from beta-eucryptite was conducted with a view toward the production of plasmas suitable for microwave application. Langmuir probe measurements on the PIG were obtained under various conditions of anode current, magnetic field, gas pressure, and probe position. Radial and longitudinal profiles of electron density, electron temperature, and plasma potential were obtained. Plasma synthesis resulting from separate emitters of electrons and lithium ions from beta-eucryptite was studied. A plasma generator utilizing this concept was designed and fabricated. (Author)

AD-637 031 **Field 20I**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
EXPERIMENTALLY DETERMINED PLASMA PERTURBATION BY A PROBE.
Revised ed.
by Roger G. Little, and John F. Waymouth. 17 Nov 65, 8p
Contract DA-36-039-AMC-03200 (E)
Revision of manuscript submitted 15 Jul 65. Prepared in cooperation with Sylvania Electric Products, Danvers, Mass.

Descriptors: (*Plasma medium, *Probes (Electromagnetic)), Plasma oscillations, Electrons, Density, Temperature, Theory, Langmuir probes.

Identifiers: Plasma probes.

The perturbation of a plasma by a probe with radius large in comparison to a mean free path is examined with a small movable probe. Electron density, electron temperature, and plasma potential are determined as a function of distance from the large probe. The experimental conditions corresponded well to those assumed by Waymouth; Waymouth's theory applied to the large-probe electron current characteristic yields a value for electron density in the unperturbed plasma that is correct within a few percent. The electron temperature so determined is too low by 19%. A fundamental assumption of all theories, that electron temperature in the perturbed volume of plasma is independent of position, is found to be incorrect, at least in a plasma containing drift currents. (Author)

AD-637 057 **Field 20I, 20F**
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
TECHNIQUE FOR MEASURING THE ABSORPTION COEFFICIENT OF A PLASMA.
Scientific rept.
by W. G. Braun. 10 Feb 65, 8p ARL-66-0040
Proj. AF-7073
Task 707300

Descriptors: (*Plasma medium, *Absorption spectrum), (*Optical analysis, Plasma medium), Plasma physics, Optical equipment, Probes, Hydrogen, Electric discharges.

Instrumentation for determining the absorption coefficient in a plasma in the optical wavelength region has been developed for the study of a hydrogen arc discharge. The arc column is scanned with a beam of its own radiation emitted from the central zone which usually displays the highest brightness. The accuracy of the attenuation measurements near the edges of the plasma column is significantly increased over the accuracy obtainable with the double-path method. The described instrumentation produces a lateral scan of the plasma in digital form suitable for the computation of the spatial distribution of the absorption coefficient. (Author)

N66-10537 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Nagoya Univ. (Japan). Inst. of Plasma Physics.
ON THE KINETIC STRUCTURE OF A PLASMA.
by J. M. Dawson, and T. Nakayama. Jul 65, 41p IPPJ-39

Descriptors: *Particle motion, *Plasma dynamics, *Kinetic friction.

For abstract, see T 66 18.

N66-10621 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Comitato Nazionale per L Energia Nucleare, Frascati (Italy). Laboratori Nazionali Di Frascati.
THE TRANSVERSE RESISTIVE WALL INSTABILITY OF EXTREMELY RELATIVISTIC BEAMS OF ELECTRONS AND POSITRONS.
by E. Ferlenghi, C. Pellegrini, and B. Touschek. 30 Aug 65, 23p LNF-65/27

Descriptors: *Electron beam, *Relativistic plasma, *Positron, *Transverse wave.

N66-13196 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Sydney Univ. (Australia).
SOME EXPERIMENTAL OBSERVATIONS OF THE ATTENUATION OF ALFVEN WAVES IN A LABORATORY PLASMA.
by I. G. Brown. May 65, 26p ER-15, NP-15357

Descriptors: *Alfven wave, *Hydrogen plasma, *Plasma physics, *Magnetohydrodynamic wave, *Wave attenuation.

N66-14607 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Max-Planck-Institut Fur Physik Und Astrophysik, Munich (West Germany).
PRODUCTION AND BEHAVIOUR OF A MAGNETICALLY STABILIZED HIGH-DENSITY HIGH-TEMPERATURE PLASMA.
by H. Wulff. Aug 65, 17p MPI-PAE/PL-12/65

Descriptors: *Electron density, *Magnetic field, *Plasma.

N66-15799 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Inst. of Plasma Physics, Nagoya Univ. (Japan).
NEGATIVE CONDUCTIVITY IN PARTIALLY IONIZED GASES.
by T. Honzawa, K. Takayama, and S. Tanaka. Oct 65, 19p IPPJ-40

Descriptors: *Ionized gas, *Negative conductance, *Bremsstrahlung, *Plasma physics.

N66-15924 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Max-Planck-Institut fuer Physik und Astrophysik, Munich (West Germany).
STARK BROADENING OF THE PASCHEN LINES.
by C. R. Vidal. Aug 65, 22p MPI-PAE/PL-13 (65)

Descriptors: *Balmer series, *Quantum number, *Stark effect.

N66-15979 **Field 20I**
CFSTI Prices: HC$3.00 MF$0.50
College of William and Mary, Williamsburg, Va. Plasma Physics Lab.
BIMODAL-CAVITY MEASUREMENT OF THE MICROWAVE FARADAY EFFECT IN A GASEOUS MAGNETOPLASMA.
Technical rept. no. 2 (thesis).
by M. T. Raiford. Jun 63, 54p
Grant NsG-106-61
NASA-CR-69655

Descriptors: *Magnetoplasma, *Microwave, *Cavity resonance, *Faraday rotation.

N66-16250 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., South Dartmouth. Center for Space Research.
ELECTRODE CURRENT DISTRIBUTIONS IN MGD CHANNELS.
by M. A. Hoffman, and G. C. Oates. Jan 66, 45p CSR-TR-66-1
Grant NsG-496
NASA-CR-69996

Descriptors: *Electrode, *Current distribution, *Electric field, *Magnetohydrodynamic generator.

N66-16407 **Field 20I**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.

ADDITIONAL STUDY AND FURTHER DEVELOPMENT OF THE TRACER-SPARK TECHNIQUE FOR FLOW-VELOCITY MEASUREMENTS.
Semiannual progress rept. no. 3.
by J. B. Kyser. Dec 65, 61p
Grant NsG-620
NASA-CR-69817

Descriptors: *Electron ionization, *Ion temperature, *Electron energy, *Flow velocity, *Spark.

N66-16408 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Coll. Observatory, Cambridge, Mass.
LINE-REVERSAL MEASUREMENTS OF EXCITATION AND ELECTRON TEMPERATURE IN A SHOCK TUBE.
by W. R. S. Garton, W. H. Parkinson, and E. M. Reeves. Nov 65, 12p
Contract NONR-1866 (48), Grant NSG-438
NASA-CR-69818

Descriptors: *Excitation, *Plasma physics, *Electron temperature, *Shock spectrum, *Spectral line.

N66-16409 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Avco-Everett Research Lab., Everett, Mass.
THE DIOCOTRON INSTABILITY IN A QUASI-TOROIDAL GEOMETRY.
by J. D. Callen, and R. H. Levy. Sep 65, 26p
Avco-Everett res. rept. 228
Contract NASw-1101
NASA-CR-69815

Descriptors: *Crossed field, *Electric field, *Electron beam, *Magnetic field, *Slipstream, *Thermal instability.

N66-16598 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Plasma Research Lab.
CHARACTERISTICS OF MAGNETOPLASMAS.
Semiannual status rept no. 12, 1 May - 31 Oct 65.
by P. Blaszuk, H. B. Hollinger, E. H. Holt, D. A. Huchital, and P. N. Y. Pan. Dec 65, 27p
Grant NsG-48
NASA-CR-70151

Descriptors: *Magnetic field, *Plasma conductivity, *Magnetoplasma, *Velocity distribution.

N66-16705 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
National Bureau of Standards, Washington, D. C.
TURBULENCE IN A RAREFIED PLASMA.
by C. M. Tchen. 15 Dec 65, 12p NBS-9005
Contract NASA Order-R-127
NASA-CR-70040

Descriptors: *Landau damping, *Poisson equation, *Rarefied plasma, *Plasma turbulence, *Turbulence effect.

N66-16719 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Maryland Univ., College Park. Dept. of Physics and Astronomy.
WING-SLOPE TECHNIQUES FOR THE ANALYSIS OF LANGMUIR PROBE CHARACTERISTICS.
by R. T. Bettinger. Aug 65, 28p Rept. no. 484
Grant NGR-21-002-057
NASA-CR-70018

Descriptors: *Ion temperature, *Langmuir probe, *Volt-ampere characteristics.

N66-16950 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Electron and Plasma Physics.
PRODUCTION OF A HOT PLASMA BY DISCHARGE IN A STRONGLY INHOMOGENEOUS MAGNETIC FIELD.
by B. Angerth, J. Ehrensvard, and H. Persson. 20 Jul 65, 16p Rept. no. 65-12

Descriptors: *Magnetic field, *Plasma discharge, *High temperature plasma, *Inhomogeneity.

N66-17095 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
College of William and Mary, Williamsburg, Va. Plasma Physics Lab.
NONLINEAR RESPONSE OF AN OSCILLATING DISCHARGE TO VERY HIGH FREQUENCY SIGNALS.
Technical rept no. 3, Jun 63 - Aug 65 (Master's thesis).
by D. B. Raiford. Aug 65, 47p
Grant NSg-106-61
NASA-CR-70323

Descriptors: *Discharge, *Nonlinear equation, *Plasma oscillation, *Very high frequency.

N66-17402 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Aktiebolaget Atomenergi, Stockholm (Sweden).
METHODS FOR THE DETERMINATION OF CURRENTS AND FIELD IN STEADY TWO-DIMENSIONAL MHD FLOW WITH TENSOR CONDUCTIVITY.
by E. A. Witalis. Dec 65, 18p AE-210

Descriptors: *Magnetohydrodynamic flow, *Reynolds number, *Tensor field, *Two-dimensional flow.

N66-17477 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Maryland Univ., College Park. Inst. for Fluid Dynamics and Applied Mathematics.
ON THE INTERACTION OF A SMALL NUMBER OF TRANSVERSE AND LONGITUDINAL MODES IN A PLASMA.
by A. Dolinsky, and R. Goldman. Jan 66, 43p
BN-434
Grant NsG-220-62
NASA-CR-70463

Descriptors: *Longitudinal wave, *Transverse wave, *Plasma wave, *Vlasov equation, *Wave interaction.

N66-17606 **Field 20I**
CFSTI Prices: HC$3.00 MF$0.75
Max-Planck-Institut Fur Physik Und Astrophysik, Munich (West Germany).
A TOROIDAL DEVICE WITH MERIDIAN MAGNETIC CONFINING FIELD OF DEL P DOT DEL LINE INTEGRAL OF DIFFERENTIAL OF LENGTH WITH RESPECT TO MAGNETIC FIELD IS GREATER THAN O PROPERTIES.
by D. Eckhartt, G. V. Gierke, and G. Grieger. Mar 65, 80p MPI-PAE (PL-6)65

Descriptors: *Magnetic field, *Plasma confinement, *Cesium plasma, *Stellarator.

N66-17642 **Field 20I**
CFSTI Prices: HC$5.00 MF$1.00
Institut Fur Plasmaphysik G.M.B.H., Garching (West Germany).
ANNUAL REPORT, 1964, OF THE INSTITUT FUR PLASMAPHYSIK GMB H MUNICH - GARCHING AND OF THE EXPERIMENTAL DEPARTMENT (PLASMA PHYSICS) OF THE MAX-PLANCK- INSTITUT FUR PHYSIK AND ASTROPHYSIK.
1965, 162p

Descriptors: *High temperature plasma, *Plasma physics, *High temperature research, *Plasma pinch.

N66-17656 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Aktiebolaget Atomenergi, Stockholm (Sweden).
INCOMPRESSIBLE STEADY FLOW WITH TENSOR CONDUCTIVITY LEAVING A TRANSVERSE MAGNETIC FIELD.
by E. A. Witalis. Dec 65, 22p AE-209

Descriptors: *Channel flow, *Incompressible fluid, *Inviscid flow, *Magnetic field.

AD-636 389 **See Field 9E**

AD-636 395 **See Field 20N**

AD-636 425 **See Field 10B**

AD-636 493 **See Field 20N**

AD-636 564 **See Field 20C**

AD-636 581 **See Field 20C**

AD-636 656 **See Field 10B**

AD-636 658 **See Field 20D**

AD-636 704 **See Field 20J**

AD-636 804 **See Field 20C**

AD-636 862 **See Field 3B**

AD-636 999 **See Field 4A**

AD-637 004 **See Field 4A**

20J. QUANTUM THEORY

AD-636 360 **Field 20J, 7D, 3B**
CFSTI Prices: HC$1.00 MF$0.50
Haverford Coll., Pa.
HIGH ACCURACY ATOMIC WAVE FUNCTIONS.
Final rept. 15 Jun 55-31 Oct 65.
by Louis C. Green. 27 Jul 66, 6p
Contract Nonr-1727 (00)
Proj. NR-014-105

Descriptors: (*Atomic energy levels, *Wave functions), Ground state, Ions, Helium, Hydrogen, Oxygen, Calcium, Lithium, Stars, Spectroscopy.

It was the purpose of the work to explore methods of obtaining highly accurate wave functions not only for the simpler atomic systems but also for those of intermediate complexity, such as Ca. As a by-product of the work at the fundamental level of finding effective methods of obtaining wave functions, it was hoped that a number of transition probabilities would become available. Each of the 15 scientific papers in which the work was published is summarized.

AD-636 370 **Field 20J, 12A**
Lincoln Lab., Massachusetts Inst. of Tech., Lexington.
IRREDUCIBLE REPRESENTATIONS OF THE ROTATION GROUP IN TERMS OF EULER'S THEOREM.
by Harry E. Moses. 12 Jul 65, 21p JA-2554A
Contracts AF 19 (628)-5167, ARPA order-600
ESD-TR-66-178

Descriptors: (*Euler's angles, *Quantum mechanics), Groups (Mathematics), Rotation, Theorems.

For abstract, see T 66 18.

AD-636 372 **Field 20J, 20N**
Lincoln Lab., Massachusetts Inst. of Tech., Lexington.

TESTING GENERAL RELATIVITY WITH RADAR.
by Irwin I. Shapiro. 13 Sep 65, 5p JA-2656
Contract AF 19 (628)-5167
ESD-TR-66-186

Descriptors: (*Relativity theory, Test methods), Radar signals, Radar reflections, Radar interference, Solar atmosphere, Gravity.

A test of the influence of solar gravity on the echo times of radar waves reflected from planets is described. A theoretical expression derived solely in terms of measurable quantities, demonstrates for a simple model of planetary motion that radar determinations of interplanetary echo times will allow the predictions of general relativity to be distinguished from those of Newtonian theory. The basic idea involves estimating the unknown parameters of the planetary orbits from time-delay measurements made when the target planet is near the earth and using the measurements made when the path of the radar wave passes near the sun to distinguish the effect of solar gravity on delay. (Author)

AD-636 489 **Field 20J**
Queen's Univ., Belfast (Northern Ireland). School of Physics and Applied Mathematics.
IMPACT PARAMETER AND SEMI-CLASSICAL TREATMENTS OF ATOMIC COLLISIONS.
by D. R. Bates, and A. R. Holt. 1966, 12p
Contract N62558-3634

Descriptors: (*Wave functions, *Atomic properties), Quantum mechanics, Approximation (Mathematics), Atomic energy levels, Great Britain.

Identifiers: Particle interactions.

The usual derivation of the equations of the impact parameter treatment is based on the assumption that the nuclei may be regarded as classical particles. These equations were obtained directly from the equations of the full quantal treatment by use of the three-dimensional J.W.K.B. approximation. The approach, besides being of interest in itself, is instructive in connexion with conditions for the validity of the impact parameter treatment and leads to more refined formulae.

AD-636 507 **Field 20J, 3B**
CFSTI Prices: HC$7.80 MF$2.25
King's Coll., Univ. of London (England).
RESEARCH PROGRAM IN RELATIVITY PHYSICS.
Scientificmade rept.
by H. Bondi. Apr 66, 478p
Contract AF 61 (052)-457
Proj. AF-7114
ARL-66-0075

Descriptors: (*Relativity theory, Scientific research), (*Gravity, Relativity theory), Time, Field theory, Projective geometry, Electromagnetic waves, Doppler effect, Spheres, Tensor analysis, Wave functions, Light, Theorms, Stars, Great Britain.

Identifiers: Gravity waves, Quasi-stellar radio sources, Space-time symmetries.

(1) Gravitational radiation. In this field a massive advance can be reported. A full understanding of the asymptotic character of space-time far from the source of the radiation was obtained. With this has come a complete understanding of the initial value problem, with conditions set on a forward light-cone. Understanding of the nature of infinity in this field was materially advanced by using methods akin to those of projective geometry. (2) Epistomological foundations. Comparison of associated theories greatly clarified understanding of the distinguishing features of general relativity. (3) High gravitational potentials. The maximum red shift that can occur on the surface of a static sphere is now fully understood in relation to the physical conditions prescribed for the interior. (4) Slowly changing fields. A start was on the understanding of the significance of the conservation laws in slowly changing systems, and the way is beginning to be open for a full understanding of energy transfer in such cases. (5) Special solutions. A good deal of understanding was gained of a number of special solutions, e.g. some relating to those discovered by Harrison, to rotating bodies, to space-times associated with bounded empty regions, etc. (Author)

AD-636 548 **Field 20J, 7D, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Uppsala Univ. (Sweden). Quantum Chemistry Group.
THE PROJECTED HARTREE - FOCK METHOD, AN EXTENSION OF THE INDEPENDENT-PARTICLE SCHEME.
by Per-Olov Lowdin. 1 Mar 66, 45p Scientific-10
Contract AF 61 (052)-874
Proj. AF-7114
ARL-66-1053

Descriptors: (*Hartree-Fock approximation, Particles), (*Wave functions, Hartree-Fock approximation), Determinants, Hamiltonian, Operators (Mathematics), Nuclear spins, Elementary particles, Molecular orbitals, Field theory, Sweden.

Identifiers: Symmetry (Quantum mechanics).

The symmetry dilemma in the ordinary Hartree-Fock schemes based on a single Slater determinant D is discussed, and it is shown that the symmetry requirements form a constraint which raises the energy and that any lowering of the energy is possible only at the expense of loss of symmetry. This phenomenon depends on the fact that the variation principle applied to a single determinant does not automatically lead to results which are compatible with the requirements resulting from the existence of constants of motion associated with the Hamiltonian of the system. In order to treat this problem, the projection operators 0 associated with a single constant of motion and with finite groups are derived, and it is shown that they form a resolution of the identity which renders a unique 'component analysis' of any trial wave function, which may both restore the symmetry and lower the energy. In the projected Hartree-Fock scheme, the total wave function is approximated by a specific projection OD, in the component analysis of D, to which the variation principle is then applied. It is shown that the wave function is directly connected with the independent-particle model in the sense that it is uniquely determined by a set of N spin-orbitals, where N is the number of particles. The properties of this scheme are discussed in some detail, and references to applications are given. (Author)

AD-636 567 **Field 20J, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Uppsala Univ. (Sweden). Quantum Chemistry Group.
NOTE ON GENERAL SPIN-ORBITALS.
by Karl-Fredrik Berggren. 15 Jan 66, 9p
Scientific-5
Contract AF 61 (052)-874
ARL-66-0152

Descriptors: (*Nuclear spins, *Hartree-Fock approximation), Operators (Mathematics), Atomic orbitals, Electrons, Lithium, Sweden.

General spin-orbitals in the Hartree-Fock theory are considered. Various expectation values of spin-operators are evaluated. The Lithium atom is treated numerically with a negative result. (Author)

AD-636 622 **Field 20J, 20N, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SCIENCE BULLETIN: SELECTED ARTICLES.
by Chu Hu, Hong-Chia Hwang, Kang-Cheng Ku, and Ming-Chir Cheu. 23 May 66, 9p FTD-TT-65-1040
TT-66-61933
Edited trans. of K'o Hsueh T'ung Pao (Chinese People's Republic) n4 p374-5 1964.

Descriptors: (*Field theory, Reviews), (*Microwaves, Reviews), (*Dams, Reviews), Textbooks, China.

Contents: Quantum theory of fields, by Chu Hu; Principles of microwaves, by Hong-Chia Hwang; Design of earth dams, by Kang-Cheng Ku and Ming-Chir Cheu. All of the above articles are book reviews.

AD-636 704 **Field 20J, 7D, 20I**
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
COLLECTIVE OSCILLATIONS OF ATOMS IN THE HARTREE-FOCK APPROXIMATION.
by Sol Wieder, and Sidney Borowitz. 6 Dec 66, 5p
Contract Nonr-285 (49), Grant DA-ARO (D)-31-124-G654
AROD-2360:37
Grant NsG-699

Descriptors: (*Hartree-Fock approximation, *Atoms), (*Argon, Electron transitions), Plasma physics, Perturbation theory, Oscillation, Spectroscopy, Excitation.

For abstract, see T 66 18.

N66-16246 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
TIME-DEPENDENT HYPERVIRIAL THEOREMS AND THE LIKE FOR VARIATIONAL WAVE FUNCTIONS.
by S. T. Epstein. 10 Jan 66, 11p WIS-TCI-146
Grant NsG-275-62
NASA-CR-69999

Descriptors: *Hellmann-Feynman theorem, *Time dependency, *Variational calculus, *Virial theorem, *Wave function.

N66-16249 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
ELECTRONIC CHARGE DENSITY IN HELIUM IN THE FIRST ORDER SHIELDING APPROXIMATION.
by J. H. Epstein, and S. T. Epstein. 4 Jan 66, 15p
WIS-TCI-145
Grant NsG-275-62
NASA-CR-69849

Descriptors: *Helium, *Electron density, *Ground state, *Nuclear physics.

AD-636 351 **See Field 20E**

AD-636 383 **See Field 20F**

AD-636 563 **See Field 20E**

AD-637 006 **See Field 7D**

20K. SOLID MECHANICS

AD-465 689 **Field 20K, 11I**
CFSTI Prices: HC$2.60 MF$0.50
Frick Chemical Lab., Princeton Univ., N. J.
THE RELATIONSHIP BETWEEN STRESS RELAXATION AND CREEP.
Technical rept.
by John J. Aklonis, and Arthur V. Tobolsky. Jun 65, 27p RLT-TR-88
Contract Nonr-1858 (07)
Proj. NR-356-377

Descriptors: (*Creep, Stresses), (*Stresses, Creep), Styrene plastics, Shear stresses, Relaxation time, Functions, Experimental data, Tables, Elasticity, Strain.

The relationship between stress relaxation and creep is investigated with the aim of mathematically converting between the two types of data. The stress relaxation master curves of five monodisperse polystyrenes are converted to creep master curves using a good approximation for the numerical evaluation of a convolution integral. Master curves generated by analytic functions are used as experimental data to investigate the behavior of creep and stress relaxation curves as the slope in the transition region changes. It is found that large changes in the slopes of stress relaxation master curves are reflected as minute slope changes in creep master curves under some conditions. It is pointed out that while systems with a narrow distribution of relaxation times and a Maxwell body are almost identical in creep, they should be easily distinguishable in stress relaxation. (Author)

AD-467 857 **Field 20K**
CFSTI Prices: HC$2.60 MF$0.50
Columbia Univ., New York. Inst. for the Study of Fatigue and Reliability.
ON FATIGUE FAILURE OF A MULTIPLE-LOAD-PATH REDUNDANT STRUCTURE.
by A. M. Freudenthal, and M. Shinozuka. Jun 65, 29p Technical rept. TR-20
Contract Nonr-266 (91)
Proj. NR-064-470

Descriptors: (*Structures, Load distribution), (*Fatigue (Mechanics), Failure (Mechanics)), Loading (Mechanics), Multiple operations, Dynamics, Fatigue (Mechanics), Reliability, Aluminum alloys, Failure (Mechanics), Stresses.

It is difficult to evaluate the survivorship or reliability function of a structure subject to fatigue consisting of a number of members from the survivorship functions of a single specimen that can be obtained from experiment. An attempt is therefore made to establish the upper and lower bounds of such a survivorship function under the assumption of constant amplitude fatigue and equal distribution of the load among the failure by Markovian processes. A numerical example employing the data of fatigue tests performed on 7075 Aluminum alloy single specimens indicates that the order of magnitude of the life of a composite structure can be reasonably well predicted by the estimate of the bounds according to the present method. (Author)

AD-636 327 **Field 20K, 11J, 21I**
CFSTI Prices: HC$5.00 MF$1.00
Graduate Aeronautical Labs., Calif. Inst. of Tech., Pasadena.
HYDROSTATIC TENSILE FRACTURE OF A POLYURETHANE ELASTOMER.
Final rept. Oct 64-Oct 65.
by Gerald H. Lindsey. Feb 66, 170p GALCIT-SM-65-25
Contract AF 33 (615)-2217
Proj. AF-7063
Task 7063-02-N-3
ARL-66-0029

Descriptors: (*Solid rocket propellant binders, Fracture (Mechanics)), (*Fracture (Mechanics), *Elastomers), (*Isocyanate plastics, Fracture (Mechanics)), Hydrostatic pressure, Tensile properties, Stresses, Deformation, Defects (Materials).

The investigation of fracture of polymeric materials in hydrostatic tensile fields constitutes an avenue of approach to the study of fracture in more general three-dimensional environments. The advantages created by the symmetry of the stress field are considerable and, on one of the cases studied, facilitates a theoretical treatment that includes large deformations, which are characteristic of this class of materials. The analysis is developed through the concept of fracture originating from a flaw, which in this instance is taken to be a spherical cavity. Through the application of energy principles, a theoretical prediction of ultimate strength is made for hydrostatic tensile fields. Experiments were conducted to demonstrate the existence of such flaws and to evaluate the theory. Results of the tests on specimens containing both residual flaws and artificially inserted ones indicate a fundamental difference in behavior as contrasted with cracks. An explanation is given linking experimental results and theoretical predictions. It is based on the concept that a flaw 'grows' in the material under load using the cavity as a nucleating point. Upon this hypothesis is built a theory of rupture in which planar cracks grow radially from the center of the cavity in the form of Saturn-ring cracks. (Author)

AD-636 348 **Field 20K**
Syracuse Univ. Research Inst., N. Y.
DEFORMATIONS AND STABILITY OF SPHERICAL SHELLS SUBJECTED TO THE ACTION OF ASYMMETRICAL LOADINGS - EXPERIMENTAL STUDY.
by R. M. Evan-Iwanowski. 1962, 16p
AROD-2465:14, N63,-10804

Descriptors: (*Structural shells, *Mechanical properties), Experimental data, Deformation, Stability, Loading (Mechanics).

This paper presents the results of an experimental investigation of the deformations and stability of spherical shallow shells subjected to asymmetrical loadings consisting of normal concentrated eccentric loads; and of normal concentrated eccentric loads superimposed upon uniform pressure in varying magnitude and order.

AD-636 401 **Field 20K, 20M**
CFSTI Prices: HC$2.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Engineering.
ON THE CONTINUUM AS AN ASSEMBLAGE OF HOMOGENEOUS ELEMENTS OR STATES.
Technical rept.
by D. C. Drucker. Jun 66, 37p TR-50
Contract Nonr-562 (20)
Proj. NR-064-424
Prepared for presentation at the IUTAM Symposium on 'Irreversible Aspects of Continuum Mechanics' Vienna, June 1966.

Descriptors: (*Continuum mechanics, Thermodynamics), Irreversible processes, Elasticity, Plasticity, Viscoelasticity, Friction.

Some of the implications are explored of considering a continuum or a 'point' in a material as an assemblage of simple models. A discussion is given of the need for and the distinction between a thermodynamics based upon a highly specialized or restricted model and one which is applicable to a wide class of material behavior. A thermodynamic statement developed on the basis of a model of material cannot be valid general principle if it is not applicable to the combined response of two or more such models. Combinations of viscous models and combinations of elastic - perfectly plastic models are discussed in these terms. The significance of reversibility, or the ability to restore the initial state through mechanical deformation and moderate temperature changes alone, is related to dislocation concepts. Materials which work-harden with strain cycling are contrasted with those which work-soften and those which have been stabilized and do neither. The distinction between frictional and plastic behavior is discussed in thermodynamic terms along with the related questions of the degree of path independence in a space of controllable state variables and the order of the infinity of independent state variables. (Author)

AD-636 482 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Army Materials Research Agency, Watertown, Mass. Materials Engineering Div.
STRESS INTENSITY FACTORS FOR SINGLE EDGE CRACKS IN RECTANGULAR SHEETS SUBJECTED TO END ROTATIONS.
Technical rept.
by Joseph M. Bloom. Jun 66, 11p
Proj. DA-1L013001A91A
Task 35563
AMRA-TR-66-14

Descriptors: (*Stresses, *Fracture (Mechanics)), Elasticity, Brittleness, Complex variables, Conformal mapping.

Stress intensity factors for single edge cracks in rectangular sheets subjected to end rotations about the centerline of the rectangle are investigated. The problem of the distribution of stress around the crack tip is reduced to the solution of a Riemann-Hilbert problem. Numerical results are presented for varying crack lengths and length/width ratios of the sheet. (Author)

AD-636 591 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE NATURE OF DYNAMIC RELAXATION OF MATERIAL UNDER HIGH-SPEED DEFORMATION AND THE PLASTIC WAVE IN A ONE-DIMENSIONAL BAR.
by Van Liang-Zao. 21 Feb 66, 34p FTD-TT-64-1125
TT-66-61912
Edited trans. of Li Hsueh Hsueh Pao (Chinese People's Republic) v7 n1 p63-80 1964.

Descriptors: (*Deformation, *Plasticity), Mechanical waves, Creep, Impact shock, Propagation, Chromium alloys, Steel, Aluminum, Rods, China.

It would be of interest to know whether the process in a material under impact deformation can be described by a single equation of state. In the present paper it is assumed that the state equation reflects the mechanical laws of impact deformation only in part of the lagrangian x-t plane. The paper considers the properties of the function (alpha, epsilon) in impact deformation and the form Radial inertia is treated as at least one of the causes for the increase in stress in the equation of state. The uniform-strain region is explained in terms of the strain-rate-dependent theory. Up to impact velocities of several tens of meters per second, friction between the sections under impact has a considerable influence on the formation and propagation of plastic waves. However, this effect is negligible when the velocity exceeds 100 m/sec. Experimental data are derived from combined analyses of high-speed deformation of short chrome-steel test projectiles and 2S aluminum bars. (Author)

AD-636 630 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.75
Houston Univ., Tex. Dept. of Mechanical Engineering.
THE EFFECT OF PLANE-SYMMETRIC MASS LOADING ON THE RESPONSE OF RING-STIFFENED CYLINDRICAL SHELLS.
Technical rept.
by C. D. Michalopoulos, and D. Muster. Aug 66, 106p TR-4
Contract Nonr-4492 (01)
Proj. NR-185-602

Descriptors: (*Stiffened cylinders, Loading (Mechanics)), (*Structural shells, Loading (Mechanics)), Rings, Reinforcing materials, Equations, Pressure.

An analytical study of the in-vacuo vibrations of a simply supported, mass-loaded thin cylindrical shell which is reinforced by equally spaced ring stiffeners is presented. Four masses are attached to each stiffening ring in a plane-symmetric fashion. The rotatory inertia of the masses is taken into account, but similar effects for the shell and ring stiffeners are neglected. Lagrange's equations are used to derive the dynamic equations of the shell

structure and the Jacobi iteration method is employed to find the natural frequencies and corresponding mode shapes. Results are given for various values and angular position of the masses. When the value of the masses is allowed to become zero, the results for the ring-stiffened shell are in close agreement with those of previous investigators. Modal analysis is used to obtain the response of the structure to two different types of excitation: (1) a band of uniform internal pressure applied as a pulse in time, (2) a pressure wave which strikes the shell transversely. Numerical results are not presented for these two cases. (Author)

AD-636 660 **Field 20K, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
NEWS OF INSTITUTIONS OF HIGHER LEARNING. PHYSICS: SELECTED ARTICLES.
by L. P. Orlenko, G. F. Efremov, and K. N. Loskutov. 23 May 66, 16p FTD-TT-65-873
TT-66-61946
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR) n4 p72-5, 143-6 1964.

Descriptors: (*Shock waves, *Metals), (*Silver compounds, *Photoconductivity), Aluminum, Copper, Mechanical waves, Damping, Bromides, Single crystals, Excitation, USSR.

Identifiers: Silver bromide.

Contents: On shock waves in metals, by L. P. Orlenko and G. F. Yefremov; On the question of the excitation and damping of photoconductivity in monocrystals of AgBr, by K. N. Loskutov.

AD-636 668 **Field 20K, 20D**
CFSTI Prices: HC$3.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
NEWS OF THE ACADEMY OF SCIENCES OF THE USSR. MECHANICS AND MACHINE BUILDING: SELECTED ARTICLES.
by L. M. Kachanov, G. I. Bykovtsev, T. D. Semykina, L. A. Rozin, and S. I. Sergeev. 21 Feb 66, 59p FTD-TT-65-1360
TT-66-61954
Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Mekhaniki i Mashionostroenie, n4 p63-76, 96-101, 172-7 1964.

Descriptors: (*Mechanical properties, Metals), Anisotropy, Plasticity, Elasticity, Deformation, Fluid mechanics, USSR.

Contents: The Creep of Anisotropic Bodies, by L. M. Kachanov; Viscous - Plastic Flow of Circular Disks and Cases of Rotation, by G. I. Bykovtsev and T. D. Semykina; Deformation Boundary Conditions in the Theory of Elasticity, by L. A. Rozin; On The Supporting Properties of a Thin Layer of Gas or a Cavitation Liquid, by S. I. Sergeyev.

AD-636 761 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Mines, Pittsburgh, Pa.
STRESS WAVES IN BOUNDED MEDIA.
Quarterly rept. for 1 Mar-31 May 66.
by Richard W. Watson, Karl R. Becker, and Frank C. Gibson. 7 Jul 66, 15p

Descriptors: (*Stresses, Materials), Metal plates, Explosive materials, Energy management, Mechanical waves.

For abstract, see T 66 18.

AD-637 013 **Field 20K, 13D**
CFSTI Prices: HC$2.00 MF$0.50
Catholic Univ. of America, Washington, D. C. Stress Analysis Lab.
DISTRIBUTION OF STRESSES IN A PRESSURIZED HOLLOW CYLINDER WITH A CIRCULAR HOLE.
Final rept., Apr 65-Jul 66.
by A. J. Durelli, C. J. del Rio, V. J. Parks, and H. Feng. Jul 66, 37p
Contract Nonr-4886 (00)
Projs. S-F013-03-02, CUA-4.142.04
Task 19.54

Descriptors: (*Stresses, *Pressure vessels), Cylindrical bodies, Structural shells, Photoelasticity, Coatings.

This paper deals with an experimental determination of stresses in a pressurized thin hollow cylinder with a circular hole. Brittle coating, mechanical and electrical strain gages and photoelasticity were used for the analysis. A comparison with a theoretical development applied to a similar case is made. Comments on the best experimental procedures to be followed in the solution of this kind of problems are made. (Author)

AD-637 103 **Field 20K**
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THIN ELASTIC PLATES.
by Chang Fu-feng. 4 Apr 66, 238p FTD-TT-65-157
TT-66-62050
Edited trans. of mono. of Ke Hsueh Chu Pan She 181p 1964.

Descriptors: (*Metal plates, *Elasticity), Theory, Thickness, Bending, Loading (Mechanics), Rectangular bodies, Stability, Vibration, Force (Mechanics), Calculus of variations, Numerical analysis, China, Boundary value problems.

Contents: the history of the development of the theory of elastic thin plates, theory of elastic thin plates, problems associated with the cylindrical bending of long rectangular plates, bending of simply supported rectangular plates, equilibrium, stability and vibration of rectangular plates with fixed edges, rectangular plates with two adjacent edges fixed and two adjacent edges simply supported, equilibrium, stability and vibration of continuous rectangular plates, problems associated with rectangular plates supported at the corner points.

N66-14245 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co., Sunnyvale, Calif.
JUNCTURE STRESS FIELDS IN MULTICELLULAR SHELL STRUCTURES. VOLUME I. NUMERICAL METHODS OF SOLVING LARGE MATRICES.
Final rept.
by F. A. Brogan. Aug 65, 33p M-77-65-5
Contract NAS8-11480
NASA-CR-68769

Descriptors: *Digital computer, *Elastic shell, *Partial differential equation, *Finite difference method, *Simultaneous linear equation.

For abstract, see T 66 18.

N66-15480 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Arizona State Univ., Tempe. Coll. of Engineering Sciences.
INVESTIGATION OF DYNAMIC BEHAVIOR OF THIN SHPERICAL SHELLS.
Semiannual technical progress rept., 1 Jun-30 Nov 65.
by J. P. Avery. 9 Dec 65, 22p
Grant NGR-03-001-013
NASA-CR-69400

Descriptors: *Dynamic response.

N66-15953 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
National Aero- and Astronautical Research Inst., Amsterdam (Netherlands).
THEORETICAL AND EXPERIMENTAL RESULTS FOR THE DYNAMIC RESPONSE OF PRESSURE MEASURING SYSTEMS.
by H. Bergh, and H. Tijdeman. Jan 65, 24p NLR-TR-F.238

Descriptors: *Dynamic response, *Transducer, *Pressure measurement.

N66-16205 **Field 20K**
CFSTI Prices: HC$6.00 MF$1.25
TRW Systems, Redondo Beach, Calif.
INVESTIGATION OF HIGH-SPEED IMPACT PHENOMENA. VOLUME II.
by J. F. Friichtenicht. Dec 65, 231p STL-4158-6015-SU-000-Vol-2
Contract NASw-936
NASA-CR-69894

Descriptors: *Hypervelocity impact, *Simulation, *Solid state device, *Particle accelerator.

N66-16245 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
RATIONAL APPROXIMATIONS TO THE GENERALIZED DUFFING EQUATION.
Final rept. 15 Jan 65-14 Jan 66.
by W. G. Fair, and Y. L. Luke. 1966, 25p
Contract NASr-63 (07)
NASA-CR-69893

Descriptors: *Differential equation, *Linear transformation, *Theoretical physics, *Duffing equation, *Nonlinear equation.

N66-16247 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor. Dept. of Engineering Mechanics.
THE ROLLING TIRE UNDER LOAD.
by S. K. Clark. 1965, 14p Rept. no. 650493
Grant NsG-344
NASA-CR-69998
Presented at the Mid-Year Meeting of the Soc. of Automotive Engr., Chicago, May 17-21 1965.

Descriptors: *Cylindrical shell, *Pneumatic equipment, *Pressure distribution, *Tire, *Dynamic pressure.

N66-16251 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co., Sunnyvale, Calif.
JUNCTURE STRESS FIELDS IN MULTICELLULAR SHELL STRUCTURES. VOLUME VIII. BUCKLING ANALYSIS OF SEGMENTAL ORTHOTROPIC CYLINDERS UNDER NON-UNIFORM STRESS DISTRIBUTION.
Final technical rept.
by B. O. Almroth, F. A. Brogan, and E. V. Pittner. Dec 65, 35p M-77-65-8
Contract NAS8-11480
NASA-CR-69995

Descriptors: *Compression buckling, *Cylindrical shell, *Structural dynamics, *Axial compression, *Orthotropic cylinder.

N66-16494 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.75
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
PANEL FLUTTER AERODYNAMICS.
Final rept. 25 Jun 64-25 Sep 65.
by E. F. E. Zeydel. 1965, 74p
Contract NAS8-11396
NASA-CR-69144

Descriptors: *Boundary layer, *Panel flutter, *Pressure probe, Supersonic flow, *Velocity probe.

N66-16590 **Field 20K**
CFSTI Prices: HC$6.00 MF$1.25
Northrop Space Labs., Huntsville, Ala. Research and Analysis Section.
INFLUENCE OF DAMPING AND MASS-STIFFNESS DISCONTINUITIES UPON THE DYNAMIC STABILITY OF A FREE-FREE BEAM UNDER A GIMBALLED THRUST OF PERIODICALLY-VARYING MAGNITUDE.
Technical memorandum no. 103.
by J. L. Hill, J. H. Kincaid, C. M. Pearson, and L. H. Wang. 1964, 216p E20-117
Contract NAS8-11255
NASA-CR-70054

Descriptors: *Transverse vibration, *Dynamic stability, *Motion stability, *Vibration damping.

N66-16600 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co., Sunnyvale, Calif.
JUNCTURE STRESS FIELDS IN MULTICELLULAR SHELL STRUCTURES. VOL. IX. SUMMARY OF RESULTS AND RECOMMENDATIONS.
Final rept.
by E. Y. W. Tsui. Dec 65, 31p LMSC-M-77-65-9
Contract NAS8-11480
NASA-CR-70149

Descriptors: *Buckling, *Cylindrical shell, *Orthotropic shell, *Bending, *Shell stability.

N66-16707 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
TRW Systems, Redondo Beach, Calif.
INVESTIGATION OF HIGH-SPEED IMPACT PHENOMENA (III), VOLUME I.
by J. F. Friichtenicht. Dec 65, 44p STL-4158-6015-SU-000-Vol-3
Contract NASw-936
NASA-CR-70032

Descriptors: *Hypervelocity impact, *Impact testing machine, *Meteorite collision.

N66-17094 **Field 20K**
CFSTI Prices: HC$7.00 MF$1.75
Chrysler Corp., Detroit, Mich. Missile Div.
RESEARCH AND INVESTIGATIVE ANALYSIS USING KRON'S METHOD OF ANALYZING REDUNDANT STRUCTURES.
by J. D. O'Rourke, and C. Rydz. 1 Nov 62, 339p
ADB-TN-29-62
Contract NAS8-5000
NASA-CR-70332

Descriptors: *Frequency, *Redundant structure, *Saturn D launch vehicle, *Mode shape.

N66-17107 **Field 20K**
CFSTI Prices: HC$4.00 MF$0.75
Michigan Univ., Ann Arbor. Tire and Suspension Systems Research Group.
THE CONTACT OF CERTAIN ELASTIC SHELLS WITH RIGID FLAT SURFACES.
Technical rept no. 3.
by D. H. Robbins. Sep 65, 104p Rept no. 05608-7-T
Grant NsG-344
NASA-CR-70333

Descriptors: *Flat surface, *Deformation, *Elastic shell, *Shell stability, *Stress analysis.

N66-17220 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Rice Univ., Houston, Tex. Dept. of Geology.
TENSILE FRACTURE ALONG A BIMATERIAL INTERFACE.
by L. Mansinha. 1964, 30p
Grant NSg-6
NASA-CR-60708

Descriptors: *Elastic property, *Fracture, *Interface, *Isotropic medium, *Propagation.

N66-17475 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.50
California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.
LITERATURE SURVEY ON THE BUCKLING OF CONICAL SHELLS.
by S. Kobayashi. Jan 66, 51p
Grant NsG-18-59
NASA-CR-70457

Descriptors: *Bibliography, *Conical shell, *Shell stability, *Buckling.

N66-17893 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Southwest Research Inst., San Antonio, Tex.
A COMPARISON OF THEORETICAL AND EXPERIMENTAL PRESSURES AND FORCES ACTING ON A RING BAFFLE UNDER SLOSHING CONDITIONS.
by L. R. Garza. Mar 66, 29p
Contract NAS8-1555
NASA-CR-385

Descriptors: *Loading, *Pressure distribution, *Sloshing, *Force distribution, *Mathematics (Gen), *Ring.

N66-18099 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.75
Liege Univ. (Belgium). Lab. de Techniques Aeronautiques et Spatiales.
DISPLACEMENT AND EQUILIBRIUM MODELS IN THE FINITE ELEMENT METHOD.
by B. F. De Veubeke. Jan 64, 84p Rept. no. SA-1

Descriptors: *Stress and load, *Variational principle, *Energy method stress calculation.

N66-18173 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Southwest Research Inst., San Antonio, Tex.
FLEXURAL VIBRATIONS OF CONICAL SHELLS WITH FREE EDGES.
by J. F. Gormley, W. C. L. Hu, and U. S. Lindholm. Mar 66, 26p
Contract NASr-94 (06)
NASA-CR-384

Descriptors: *Conical shell, *Mode shape, *Resonant frequency, *Transverse vibration.

N66-18178 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.75
California Univ., Berkeley.
A THEORY OF ANISOTROPIC VISCOELASTIC SANDWICH SHELLS.
by J. L. Baylor. Mar 66, 72p
Grant NsG-637
NASA-CR-396

Descriptors: *Anisotropic shell, *Sandwich construction, *Viscoelasticity.

UCRL-14617 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
PROPAGATION OF STRESS DISTURBANCES IN ELASTIC-PLASTIC CYLINDERS ONE-DIMENSIONAL THEORIES.
by R. J. Wasley. 21 Dec 65, 72p
Contract W-7405-eng-48

Descriptors: (*Cylindrical bodies, Stresses), (*Stiffened cylinders, Elasticity).

For abstract, see N 20 16.

AD-465 537 **See Field 11F**

AD-465 538 **See Field 11F**

AD-636 318 **See Field 13I**

AD-636 344 **See Field 20L**

AD-636 346 **See Field 20M**

AD-636 488 **See Field 13M**

AD-636 914 **See Field 13M**

AD-636 992 **See Field 20D**

AD-637 105 **See Field 1C**

20L. SOLID STATE PHYSICS

AD-636 316 **Field 20L, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Oregon State Univ., Corvallis. Dept of Chemistry.
THE THERMODYNAMICS OF M-CENTER FORMATION.
Technical rept.
by John D. Zahrt, Allen B. Scott, and E. H. Coker. 10 Jul 66, 19p TR-8
Contract Nonr-1286 (05)
Proj. NR-018-701
Report on a Magnetic Study of Color Centers in Alkali Halides.

Descriptors: (*Color centers, *Thermodynamics), (*Potassium compounds, *Chlorides), Alkali metal compounds, Halides, Crystal lattice defects, Concentration (Chemistry), Enthalpy, Entropy, Ions, Chemical equilibrium.

The equilibrium between F centers and M centers in additively colored KC1 was studied at temperatures between 60C and 130C. The M-center concentration at equilibrium varied approximately as the square of the F-center concentration, verifying the stoichiometric equation: 2F = M. At 60C, the equilibrium constant was 1.7 x 10 to the-19th power cu.cm. Enthalpy change = -4.1 Kcal and entropy change = -98 cal/deg. for the standard state one center cu.cm. The entropy change value agrees with that calculated from the configurational entropy, i.e., R 1n 6/N, where N is the concentration of negative ion sites. (Author)

AD-636 324 **Field 20L, 17B**
CFSTI Prices: HC$4.00 MF$0.75
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
STUDY OF NOISE IN SEMICONDUCTOR DEVICES.
Semi-annual technical rept. no. 1, 16 Sep 65-15 Mar 66.
by A. van der Ziel. Jul 66, 103p
Contract DA-28-043-AMC-01701 (E)
Proj. DA-1P6-22001-A-056-01-02
ECOM-01701-1

Descriptors: (*Semiconductor devices, *Noise (Radio)), Transistors, Diodes (Semiconductor), Low frequency, High frequency, Ultrahigh frequency, Carriers (Semiconductors), Space charges, Solid state physics.

The report presents the progress of experimental and theoretical investigation of noise in solid state devices such as transistors, junction and MOS FET's, PIN diodes, junction laser diodes and the like. The noise properties of microwave transistors, transistor noise at high injection levels, and transistor 1/f noise at elevated temperatures are studied in particular.

AD-636 340 **Field 20L, 20H**
Brandeis Univ., Waltham, Mass.
TWO PHOTON DECAY POSITRONS IN TRANSITION METALS.
by S. Berko, and J. H. Terrell. 1965, 10p
AROD-3389:10
Research supported in part by NSF.

Descriptors: (*Band theory of solids, Annihilation reactions), (*Positrons, *Annihilation reactions), (*Photonuclear reactions, *Ferrites), Photons, Decay schemes, Transition elements, Metals, Wave functions, Electrons, Electron spin resonance, Polarization.

The use of positron annihilation experiments to study band structure of metals is briefly reviewed. A new model computation of positrons decaying in transition metals is presented, in an attempt to analyze recent experiments of polarized positrons annihilating in ferromagnetic metals. Wigner-Seitz positron wavefunctions are computed for iron and allowed to annihilate with d band electrons obtained from APW band computations, and the predicted change in angular distribution upon electron spin reversal is compared with the experimental results. The effect of possible negative conduction band polarization is discussed. (Author)

AD-636 341 **Field 20L, 20B**
Pittsburgh Univ., Pa. Dept. of Physics.
NUCLEAR-MAGNETIC-RESONANCE SPIN-LATTICE RELAXATION IN HIGH AND LOW FIELDS.
by Barent C. Johnson, and Walter I. Goldburg.
7 Dec 65, 11p
AROD-2636:8
Research supported in part by NSF.

Descriptors: (*Nuclear magnetic resonance, Relaxation time), (*Crystal lattices, Nuclear spins), (*Nuclear spins, Relaxation times), Sodium compounds, Chlorides, Symmetry (Crystallography), Line spectrum, Dipole moments, Hamiltonian.

Identifiers: Sodium chloride, Spin-lattice relaxation.

An experimental and theoretical study is presented of the magnetic-field dependence of nuclear-magnetic-resonance (NMR) spin-lattice relaxation in solids. Theoretically, density-matrix methods are used along with the spin-temperature assumption to derive an expression for the field dependence of the relaxation time T1 in the laboratory and rotating reference frames. It is shown that with the assumptions of extreme narrowing and cubic symmetry, the ratio of the Zeeman relaxation time to the dipolar relaxation time should be two for a one-ingredient crystal in both the laboratory and rotating reference frames. The ratio of the Zeeman T1 to the dipolar T1 is also calculated for two-ingredient crystals. To test the theory, measurements were made of the field dependence of the laboratory- and rotating-frame spin-lattice relaxation times of the sodium nuclei in NaCl. There is a large discrepancy between the calculated and measured ratios of high-field to low-field relaxation times in both frames. The origin of the discrepancy is not fully understood. (Author)

AD-636 344 **Field 20L, 20K, 11B**
IIT Research Inst., Chicago, Ill.
KILOCYCLE-RANGE DISLOCATION DAMPING IN MAGNESIUM OXIDE.
by P. D. Southgate, K. S. Mendelson, and P. L. DePerro. 28 Jun 65, 10p
AROD-4518:8
Research supported in part by AFML.

Descriptors: (*Magnesium compounds, Oxides), (*Crystal lattice defects, damping), Deformation, Vibration, Internal friction, Strain, Annealing, Heat of activation, Impurities, Chromium, Temperature, Frequency.

Identifiers: Magnesium oxides.

Measurements of temperature, frequency, and amplitude dependence of dislocation damping in plastically deformed MgO have been made in the kilocycle range. The low-amplitude damping shows a broad maximum around 150C, with little variation below room temperature down to 78K. The damping decreases slightly with increasing frequency and the maximum moves to a slightly higher temperature. At strain amplitudes of greater than about 0.000002 the damping increases steadily. The excess damping does not give a straight Granato-Lucke plot; it usually gives a relatively straight line of slope 0.8 on a log delta vs log epsilon plot. The amplitude-dependent damping varies more strongly with temperature than the low-amplitude damping. Annealing at temperatures between 350C and 650C causes a steady decrease of damping which may be associated with a process having an activation energy of 2.0 to 2.6 eV. A composite annealing curve, obtained from curves taken at different temperatures, yields a damping which varies as (annealing time) to the -0.4th power over many decades of time. Varying concentrations of many impurities, including iron, seem to have little effect on the behavior, but the introduction of 0.05 at.% chromium reduces temperature dependence and amplitude dependence and introduces a further process of lower activation energy in the early stages of annealing. The results cannot readily be interpreted in terms of the usual theories of dislocation damping. (Author)

AD-636 347 **Field 20L, 20M**
Duke Univ., Durham, N. C. Dept. of Physics.
SECOND SOUND IN SOLID HELIUM.
by C. C. Ackerman, B. Bertman, H. A. Fairbank, and R. A. Guyer. 25 Mar 66, 3p
AROD-3824:8

Descriptors: (*Helium, Solid state physics), Temperature, Electromagnetic pulses, Propagation, Low-temperature research.

For abstract, see T 66 18.

AD-636 367 **Field 20L**
Washington Univ., St. Louis, Mo. Dept. of Physics.
SPIN-SPIN RELAXATION IN LaF.
by M. Goldman, and L. Shen. 29 Nov 65, 11p
Grant AF-AFOSR-771-65

Descriptors: (*Lanthanum compounds, *Fluorides), (*Nuclear magnetic resonance, Fluorine), Single crystals, Temperature, Nuclear spins, Crystal lattices, Precession, Dipole moments.

Identifiers: Lanthanum trifluoride, Spin-spin relaxation.

The work involved a study by nmr pulse techniques of the motion of fluorine atoms in lanthanum trifluoride as a function of temperature, between 100 and 560C. The experiments were conducted with a single crystal of LaF3. The model for the motions derived from this study is the following: There are two types of fluorine nuclei, the spins I and the spins S, located on different sublattices. Between 100 and 300C, the motion of the spins I is fast (i.e., such as to be appreciable in times shorter than the reciprocal of the rigid-lattice line width), and the motion of the spins S is slow. There is an exchange of atoms between the two sublattices, the rate of which is slow up to about 300C and fast at higher temperature. The ratio of populations of the spins I and S is N-I/N-S=2. Approximate values are derived for the activiation energies associated with these two types of motion. (Author)

AD-636 369 **Field 20L, 20C**
Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE GUNN EFFECT IN POLAR SEMICONDUCTORS.
Doctoral thesis.
by A. G. Foyt, and A. L. McWhorter. 27 Sep 65, 10p JA-2644
Contract AF 19 (628)-5167
ESD-TR-66-184

Descriptors: (*Semiconductors, Electrical properties), Carriers (Semiconductors), Electric currents, Stability, Resistance (Electrical), Gallium alloys, Arsenic alloys, Cadmium alloys, Tellurium alloys, Lead alloys, Solid state physics.

Identifiers: Gunn effect.

The main features of the Gunn effect can be accounted for by the transferred electron model of Ridley and Watkins, which predicts a bulk differential negative resistance and subsequent domain formation if electrons can be transferred sufficiently rapidly from the lowest conduction-band minimum to lower-mobility subsidiary minima. Experimental results for n-GaAs in verification of such a bulk negative resistance are presented. In the longer samples the current-time waveform consists of sharp spikes separated by flat valleys, as expected from the motion of domains. The voltage across the domains is found to scale with sample length as predicted; the value of the electric field inside the domain is estimated to be or = 60 000 V/cm, while the field outside is about 1500 V/cm. Gunn effect oscillations have also been observed in n-CdTe, but not in n-InSb or n-InAs. The absence of an instability in InSb and InAs is consistent with the transferred electron model, since the subsidiary minima in these materials are believed to be too high in energy to be populated before carrier multiplication occurs. Finally, it will be shown that unless the separation of the conduction-band minima is very small, the critical electric field at which the Gunn effect occurs is reasonably well predicted by the one-band polar optical mode runaway field. (Author)

AD-636 373 **Field 20L, 7D**
General Electric Co., Schenectady, N. Y. Research and Development Center.
ATOMIC DISPLACEMENTS IN ONE- AND TWO-DIMENSIONAL DIFFUSION.
by Gert Ehrlich. 30 Aug 65, 9p Reprint-5360
Contract AF 49 (638)-1362
Proj. AF-9760
Task 97003
AFOSR-66-1050

Descriptors: (*Crystal lattices, *Diffusion), Surface properties, Atomic properties, Probability, Numerical analysis, Statistical distributions, Microscopy, Field emission, Grain boundaries.

Identifiers: Field ion microscopy.

The statistics of surface diffusion phenomena are developed for the conditions appropriate to measurements in the field-ion microscope. Examined in detail are: (1) The effect of boundaries (lattice steps) on the mean-square displacement in a random walk; (2) the probability density for distances traversed in a two-dimensional walk along nonorthogonal surface channels; (3) the distribution of distances for random walks in which the number of jumps is subject to fluctuation, as it is in real systems. Both reflecting and adsorbing boundaries are found to diminish the mean-square displacement in the same fashion. The effect of nonorthogonality, and even more so of fluctuations, is to enhance the frequency of small displacements when compared with a Rayleigh distribution. (Author)

AD-636 374 **Field 20L, 7D**
General Electric Co., Schenectady, N. Y. Research and Development Center.
ATOMIC VIEW OF SURFACE SELF-DIFFUSION: TUNGSTEN ON TUNGSTEN.
by Gert Ehrlich, and F. G. Hudda. 30 Aug 65, 13p Reprint-5359
Contract AF 49 (638)-1362
Proj. AF-9760
Task 97003
AFOSR-66-1048

Descriptors: (*Crystal lattices, *Diffusion), (*Tungsten, Diffusion), Surface properties, Atomic properties, Grain boundries, Chemical bonds, Crystal structure, Microscopy, Field emission.

Identifiers: Field ion microscopy.

Surface diffusion of tungsten adatoms on several smooth, low-index planes of the tungsten lattice has for the first time been followed by direct observation of individual atoms in the field-ion microscope. Contrary to expectation, the mobility at room temperature is found to increase in the order (211)> (321) approx. = (110)> (310) approx. = (111). Migrating atoms are reflected at the boundaries of the (110), (211), and (321) planes; on the latter two, motion along atomic rows is favored over diffusion across lattice steps. From quantitative determinations of the rate of change of the mean-square displacement, diffusion coefficients are obtained as follows: (110), D=1/3 sq. exp (-22,000/RT) sq. cm/sec; (321), 1/10 cu. exp (-20,000/RT); (211), 20 to the 7th power exp (-13,000/RT). Differences in diffusion on the (211) and (321), planes of very similar structure, suggest a weakening of interatomic forces at lattice edges. (Author)

AD-636 386 **Field 20L, 9C**
CFSTI Prices: HC$3.00 MF$0.75
Raytheon Co., Waltham, Mass. Research Div.
TRANSIENT AND STEADY STATE ABSORPTION OF MICROWAVE POWER UNDER PARALLEL PUMPING. I. THEORY.
by R. Joseph, and E. Schlomann. 15 Jun 66, 86p
Scientific-1, S-878
Contract AF 19 (628)-3861
Proj. AF-4600
Task 460003
AFCRL-66-455

Descriptors: (*Microwaves, Adsorption), (*Pumping (Electronics), *Nuclear spins), Ferromagnetic materials, Field theory, Transients, Power.

The transient growth of the spin wave population in a microwave magnetic field applied parallel to the dc field is investigated. It is assumed that the sample is in thermal equilibrium before the initiation of the microwave pulse, and that the rf field amplitude remains constant during the pulse. According to the theory the absorption coefficient approaches a steady state value below threshold, and grows indefinitely (as long as the field amplitude remains constant) above threshold. The results of detailed calculations concerning the steady state and the transient absorption are described. Above threshold the time dependence of the absorption coefficient is characterized by a very fast initial rise to an intermediate plateau or hump, a subsequent more gradual rise, and an approximately exponential rise at later times. As the absorption coefficient increases the field amplitude in the cavity decreases (assuming that the incident power remains constant). This reaction of the sample upon the field amplitude is taken into account in an approximate fashion. Because of this reaction the absorption coefficient approaches a new steady state above threshold. (Author)

AD-636 387 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., Berkeley. Dept of Physics.
SUBCENTIMETER WAVELENGTHS.
Final rept.
15 Jul 66, 6p
Contract Nonr-222 (58)
Proj. NR-018-407

Descriptors: (*Infrared research, *Solid state physics), Superconductivity, Magnetic resonance, Absorption, Ferroelectricity.

For abstract, see T 66 18.

AD-636 421 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Delaware Univ., Newark. Dept. of Physics.
INHOMOGENEOUS FIELD DISTRIBUTION IN HOMOGENEOUS SEMICONDUCTORS HAVING AN N-SHAPED NEGATIVE DIFFERENTIAL CONDUCTIVITY.
Technical rept.
by Karl W. Boer, and P. L. Quinn. Jul 66, 33p
TR-13
Contract Nonr-4336 (00)
Supported in part by ARO (D).

Descriptors: (*Semiconductors, *Electrical conductance), Crystal lattice defects, Electric fields, Oscillation, Differential equations, Integral equations, Diffusion, Carriers (Semiconductors), Band theory of solids, Stability.

Identifiers: Gunn effect, Negative differential conductivity.

Layer-like field inhomogeneities in homogeneous semiconductors which have been shown to occur whenever the conductivity decreases faster than linearly with increasing field strength, are discussed using Poission and transport equations including drift and diffusion terms only. Stationary solutions are obtained for differential negative conductivity due to field-dependent carrier concentration or to field-dependent mobility in an approximation neglecting the diffusion term in the transport equation. When the diffusion is included, the method of characteristics is used to compare solutions for the case of field-dependent carrier concentration with the case of field-dependent mobility. A linear analysis of the behavior of solutions near singular points is conducted for more detailed information about the solution near boundaries. (Author)

AD-636 479 **Field 20L, 7D**
CFSTI Prices: HC$6.00 MF$1.50
Massachusetts Inst. of Tech., Cambridge.
SOLID-STATE AND MOLECULAR THEORY GROUP.
Quarterly progress rept. no. 61.
15 Jul 66, 279p
Contract Nonr-1841 (34), Grant NSF-G-24908
Contract AF 19 (628)-356, Grants NSF-GP-3241, NSF-G-10821.

Descriptors: (*Solid state physics, Reviews), (*Molecular properties, Reviews), Scientific personnel, Reports, Band theory of solids, Magnetism, Hartree-Fock approximation, Crystal-lattice defects.

Contents: The solid-state and molecular theory group-fifteen years' report; Advanced degrees awarded from SSMTG, 1951-1966; Former members of SSMTG; Present members of SSMTG; Publications and biographical data regarding past and present members of SSMTG; Technical reports published by the SSMTG; The current state of solid-state and molecular theory, by John C. Slater.

AD-636 502 **Field 20L, 9A**
CFSTI Prices: HC$2.00 MF$0.50
RCA Labs., Princeton, N. J.
LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.
Summary rept., 31 May 65-30 May 66.
by M. L. Schultz, R. Dalven, and C. D. Rowlev.
1 Aug 66, 40p
Contract Nonr-2225 (00)
See also AD-617 325.

Descriptors: (*Infrared photoconductors, Cryogenics), (*Photomultipliers, Infrared photoconductors), Carriers (Semiconductor), Films, Photoconductivity, Semiconductors, Band theory of solids, Ionization, Selenium, Silver compounds, Chlorides, Cadmium compounds, Sulfides, Germanium, Lead alloys, Tellurium alloys.

The first results obtained in studies directed toward the development of an infrared photoconductive multiplier are summarized. This device, which is a solid state analog of the secondary emission multiplier for photoelectrons, is to be a multilayered structure consisting of a suitable photoconductor followed by alternate layers of wide and narrow band gap semiconductors. Carriers optically excited in the photoconductor are accelerated in the first wide band gap semiconductor layer. When these enter the narrow band gap material, their excess energy is lost in production of electron-hole paris by intrinsic impact ionization. The additional carriers so produced are accelerated in the second wide band gap layer to produce additional multiplication in the second narrow band gap layer, and so on. The problem considered in the present report is the choice of suitable materials for the wide band gap layers. One such material is amorphous selenium. Holes photoexcited in a photoconductor can be injected into and transported through Se layers. Electrons are not transported. Other possible wide band gap materials include silver chloride and cadmium sulfide. These have not yet been extensively investigated. The problem of accelerating carriers to high energies in the wide band gap material will receive primary attention in the next phase of the work. (Author)

AD-636 520 **Field 20L, 20B**
CFSTI Prices: HC$2.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa.
THE RELATIONS BETWEEN ELECTRICAL NOISE AND DISLOCATIONS IN SILICON.
Technical rept.
by K. K. Yu, A. G. Jordan, and R. L. Longini. 19 Jul 66, 46p
Contract Nonr-760 (25)
Proj. NR-032-487

Descriptors: (*Silicon, Crystal lattice defects), (*Noise (Radio), Silicon), Semiconductors, Band theory of solids, Carriers (Semiconductors), Electrical conductance.

The effect of edge dislocations on electrical noise in n-type silicon was investigated. Parallel arrays of edge dislocations were introduced by plastic deformation in vacuum at near 950C, and the amount of dislocations introduced has been examined by etch pits. Electrical conductivity and noise measurements confirm Shockley-Read model, according to which edge dislocations behave as lines of acceptors in semiconductors with the diamond structure. From the conductivity measurements, values of the fractional disturbed volume, epsilon, of the conductive sample were deduced in accordance with Read's theory. Noise results in dislocated samples show 1/f and g-r components differing from those of control samples obtained from the same ingot and also differing from samples subjected to the same heat treatment but without introduced dislocations. The g-r noise can be explained in terms of fluctuations in epsilon, which in turn are caused by fluctuations in the number of captured electrons at the dislocation sites. It was found that, in the temperature range 25C-170C, for 200 ohm-cm samples, the observed time constants and noise amplitudes are consistent with fluctuation phenomena associated with the dislocation sites acting as recombination centers. However, at near and below room temperature trapping at the dislocation sites seems to be the primary cause of the observed noise behavior. (Author)

AD-636 562 **Field 20L**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
NORMAL MODES IN HEXAGONAL BORON NITRIDE.
Revised ed.
by R. Geick, C. H. Perry, and G. Rupprecht. 4 Feb 66, 5p
Contract DA-36-039-AMC-03200 (E), Grant NSF-GP-2111
Revision of manuscript submitted 25 Oct 65. Prepared in cooperation with Borders Electronics Research Corp., Waltham, Mass.

Descriptors: (*Boron compounds, *Crystal lattices), (*Nitrides, Crystal lattices), Infrared properties, Reflection, Wave transmission, Infrared spectroscopy, Selection rules, Raman spectrum, Absorption spectrum, Phonons, Crystal structure.

Identifiers: Boron nitride.

Pyrolytic boron nitride, a rather anisotropic material among the III-V compounds was investigated in reflection and transmission, using polarized infrared radiation in the spectral range from 100/cm to 3000/cm. The reflection spectra were analyzed by means of a Kramers-Kronig analysis and a classical oscillator fit. The results indicate one infrared active lattice mode for in-plane motion of the particles and one for out-of-plane motion, in accordance with the boron-nitride structure reported by Pease and the resulting group-theoretical selection rules. In addition, one Raman line was found corresponding to a lattice mode for in-plane motion. Furthermore, the absorption spectrum exhibits several minor peaks which are probably due to 2-phonon combination processes. (Author)

AD-636 569 **Field 20L**
National Research Council of Canada, Ottawa (Ontario).
THE EFFECT OF HYDROSTATIC PRESSURE ON THE FERMI SURFACES OF COPPER, SILVER AND GOLD.
by I. M. Templeton. 27 Oct 65, 11p NRC-8969

Descriptors: (*Copper, Atomic energy levels), (*Silver, Atomic energy levels), (*Gold, Atomic energy levels), (*Atomic energy levels, Transition elements), Hydrostatic pressure, Brillouin zones, Deformation, Oscillation, Phase studies, Magnetic fields, Canada.

Identifiers: Fermi surfaces.

The distortion of the Fermi surfaces of the noble metals as a result of hydrostatic pressure was studied by the observation of phase changes in de Haas-van Alphen oscillations in the pressure range 1 to 25 atm at 1K. A relative change of phase with pressure between (111) belly and neck oscillations was observed: the direction of the change shows that the neck cross-sections are increasing in size relative to the bellies. Measurements by a null method of the absolute phase change with pressure of the belly oscillations in a steady magnetic field were also made. Despite complications due to intermodulation effects from the neck oscillations, these measurements have shown that the rates of increase of the belly cross-sections are somewhat smaller than would be expected from published figures for compressibility. A combination of these results with the measurements of relative phase change show that the overall rates of increase with pressure for the neck cross-sections are in copper about 4.2 in silver about 7.3 and in gold about 5.4 times greater than would be the case if the Fermi surface simply expanded uniformly with the Brillouin zone. (Author)

AD-636 602 **Field 20L, 20A, 20C**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF SCREENING ON THE ACOUSTIC-ELECTRIC EFFECT IN SEMICONDUCTORS WITH ONE KIND OF CURRENT CARRIERS.
by E. P. Pikatilov, and B. V. Prepelina. 2 Mar 66, 9p FTD-TT-65-988
TT-66-61918
Unedited rough draft trans. of Trudy po Fizike Poluprovodnikov (USSR) n1 p15-18 1962.

Descriptors: (*Semiconductors, Electrical properties), Acoustics, Carriers (Semiconductors), Piezoelectric effect, Solid state physics, USSR.

Identifiers: Acoustoelectric effect.

For abstract, see T 66 18.

AD-636 611 **Field 20L, 11C**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF AGGREGATION FORM OF ORGANIC DYES ON THEIR PHOTOSEMICONDUCTIVE AND PHOTOMAGNETIC (E.P.R.) PROPERTIES.
by A. M. Meshikov, and V. E. Kholmogorov. 25 May 66, 11p FTD-TT-65-1797
Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady v160 n2 p394-7 1965.

Descriptors: (*Dyes, Molecular association), (*Photoconductivity, Dyes), (*Paramagnetic resonance, Dyes), Films, Band theory of solids, Carriers (Semiconductors), Heat of activation.

Identifiers: Triphenyl methanes, Xanthenes.

For abstract, see T 66 18.

AD-636 614 **Field 20L, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Centre National de la Recherche Scientifique, Paris (France).
FAR-INFRARED SPECTRA OF CRYSTALS AND SOLIDS IN A LARGE RANGE OF TEMPERATURES.
Final rept., (Scientific).
by J. Lecomte, and A. Hadni. 31 May 66, 22p
Contract AF 61 (052)-518
AFCRL-66-521
Prepared in cooperation with Faculte des Sciences de Nancy.

Descriptors: (*Infrared spectroscopy, Cryogenics), (*Crystals, Infrared spectroscopy), Crystal lattices, Electron transitions, Absorption spectrum, Reflection, Chemical bonds, Vibration, Instrumentation, Quartz, Silicon compounds, Dioxides, France.

Development was undertaken of Far-Infrared techniques at liquid helium temperatures to get absorption and reflection spectra from which are deduced the optical constants of the solids. They appear fruitfull and disclose: (1) the supertransmission of crystals at low temperature in the far-infrared; (2) the different behaviour of crystals and glasses; (3) far infrared electronic transitions in several materials; (4) a drastic change of damping and anharmonicity with temperature. (Author)

AD-636 625 **Field 20L, 20C, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECTS OF DESOLVATION OF A Pb-Sb ALLOY ON THE CRITICAL CHARACTERISTICS OF SUPERCONDUCTORS.
by Chang Che-ray, Tsao Shao-wen, and Guan Wei-yen. 4 Apr 66, 10p FTD-TT-65-887
TT-66-61936
Edited trans. of Wu Li Hsueh Pao (Chinese People's Republic) v20 n6 p568-70 1964.

Descriptors: (*Superconductors, Lead alloys), China, Antimony alloys, Magnetic properties, Cryogenics, Solubility.

The paper is concerned with the effects of desolvation of Pb-Sb alloy on the j sub c (H) curve. It is shown experimentally for the first time that the high critical fields of superconductors in strong magnetic fields and their high current densities have entirely different origins. It is demonstrated that the two models - open lattice and negative boundar energy - must be used together to account for the over-all behavior of hard superconductors.

AD-636 643 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Case Inst. of Tech., Cleveland, Ohio.
DEPOSITION OF CARBON ON DIAMOND SEED CRYSTALS.
by John C. Angus. 5 Jul 66, 28p Scientific-2
Contract AF 19 (628)-4785
Proj. AF-4608
Task 460805
AFCRL-66-499

Descriptors: (*Semiconductors, Diamonds), (*Diamonds, *Crystal growth), (*Carbon, Deposition), Pyrolytic graphite, Hydrogen, Reaction kinetics, X-ray diffraction analysis, Vapor plating, Methane.

The reaction rates of hydrogen with pyrolytically deposited graphite and with natural diamond powder were investigated in order to determine the optimal conditions for removing graphite from diamond. The work covered the temperature range from 1000C to 1100K and the pressure range from 52 to 69 atmospheres of hydrogen. At 52 atm. and 1271K the reaction rate of diamond is three orders of magnitude less than that of graphite, indicating that graphite can be selectively removed with little loss of diamond. The experimentally determined rate equations were used to compute plots of percent diamond reacted versus temperature with pressure, reaction time, and percent graphite removal as parameters. By using these figures, one can determine the optimal conditions for removing the graphite from the diamond subject to various constraints placed on the system. More depositions of carbon on diamond seed crystals were performed and net weight increases of the seed crystals observed. The deposited structure has a reaction rate with hydrogen similar to that of diamond. Preliminary X-ray diffraction studies show only the presence of sharp diamond lines. (Author)

AD-636 678 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE PHOTOVOLTAIC METHOD OF MEASURING THE SPECIFIC RESISTANCE OF EPITAXIAL LAYERS.
by K. Piotrowski, and J. Swiderski. 26 May 66, 8p FTD-TT-65-1957
TT-66-61962
Unedited rough draft trans. of Przeglad Elektroniki (Poland) n1 p39-41 1965.

Descriptors: (*Semiconducting films, Resistance (Electrical)), (*Non-destructive testing, Semiconducting films), Photoconductivity, Test methods, USSR.

For abstract, see T 66 18.

AD-636 777 **Field 20L, 20F**
California Univ., San Diego, La Jolla. Dept. of Physics.
ELECTRONIC STATES IN METALS.
Technical rept.
by W. Kohn. 15 Jul 66, 19p TR-40
Contract Nonr-2216 (11)
Proj. NR-017-630

Descriptors: (*Metals, *Optical properties), (*Atomic energy levels, Metals), Electrons, Electron transitions, Band theory of solids, Absorption spectrum, Photons.

The paper is a short review of the nature of electronic states in metals, with special reference to optical properties. The formal relationship between electronic states in metals and their optical properties is described. The model of non-interacting electrons is briefly discussed. Finally, a survey of the current status of our knowledge of real electronic states is given, with emphasis on the effects of electron-electron interactions. (Author)

AD-637 014 **Field 20L, 20M**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., Los Angeles. Dept. of Chemistry.
AN APPARATUS FOR THE MEASUREMENT OF THE PROPERTIES OF CRITICAL MIXTURES AT LOW TEMPERATURE.
Technical rept.
by Charles M. Knobler. 15 Jul 66, 12p TR-1
Contract Nonr-4756 (05)
NR-051-474

Descriptors: (*Cryostats, Thermodynamics), (*Cryogenics, mixtures), Pressure gages,

Vapor pressures, Carbon compounds, Fluorides, Measurement, Transition temperature.

Identifiers: Carbon tetrafluorides.

An apparatus was constructed to serve as the basic unit for measurements of the properties of critical mixtures at low temperatures. It is designed to maintain measuring cells at temperatures constant to 0.0001K for long periods of time and in the range 77K to room temperature. The performance of a precision pressure gage, used in conjunction with this cryostat was also critically evaluated. Preliminary measurements of the vapor pressures of pure CF4 were performed. (Author)

AD-637 036 **Field 20L, 20B**
Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
LATTICE VIBRATIONAL PROPERTIES OF HEXAGONAL CdSe.
by R. Geick, C. H. Perry, and S. S. Mitra. 25 Oct 65, 4p
Contract DA-36-039-AMC-03200 (E), Grant NSF-GP-2111
Contract AF 19 (628)-2418.

Descriptors: (*Cadmium compounds, *Crystal lattices), (*Selenides, Crystal lattices), Single crystals, Reflection, Polarization, Chemical bonds, Vibration, Infrared phenomena, Wave transmission, Phonons, Band theory of solids, Brillouin zones.

Identifiers: Cadmium selenide.

The reflectivity of single-crystalline CdSe was studied with linearly polarized light at room temperature and at liquid-nitrogen temperature. The characteristic data of the fundamental lattice vibration were determined by means of a classical oscillator fit. A shift of 6/cm or 3.5% in the infrared eigenfrequency was found, due to anisotropy splitting. Transmission measurements yielded several multiphonon peaks and an impurity band. The multiphonon peaks are interpreted in terms of a set of four representative phonon energies for the edge of the Brillouin zone. (Author)

AD-637 058 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
RELAXATION AND ELECTRON PARAMAGNETIC RESONANCE.
by Kazimierz Antonowicz. 9 May 66, 27p FTD-TT-65-1441
TT-66-62033
Edited trans. from Postepy Fizyki (Poland), v16 n1 p25-40 1965.

Descriptors: (*Paramagnetic resonance, *Relaxation time), (*Semiconductors, Paramagnetic resonance), (*Coal, Paramagnetic resonance), Absorption spectrum, Line spectrum, Crystals, Crystal lattices, Nuclear spins, Metals, Carriers (Semiconductors), Atomic energy levels, Poland.

The application of EPR spectroscopy to phenomena observed mainly in the solid state is discussed. Topics include: Relaxation times and absorption line shape; exchange narrowing of resonance lines; spin-lattice interaction; electron paramagnetic resonance in metals; resonance in the donor and acceptor centers of semiconductors; electron paramagnetic resonance in coals.

LA-3467 **Field 20L**
CFSTI Prices: HC$3.00 MF$0.50
Los Alamos Scientific Lab., N. Mex.
LOS ALAMOS STRAIGHT LINE DIAGRAM FOR POWDER PATTERN INDEXING.
by James S. Coleman, and B. B. McInteer. Jan 66, 51p
Contract W-7405-eng-36

Descriptors: (*X-ray diffraction analysis, Indexes).

For abstract, see N 20 16.

N66-14255 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Radio Corp. of America, Princeton, N. J. Defense Electronic Products.
INTERACTION OF ELECTRONIC CURRENT WITH HYPERSONIC WAVES IN SOLIDS.
Quarterly progress rept., 1 Jan-31 Mar 64.
by R. F. Mayo. 10 Apr 64, 27p
Contract NAS8-11120
NASA-CR-68096

Descriptors: *Cadmium sulfide, *Electric current, *Solids, *Wave.

N66-15448 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
North Carolina State Univ., Raleigh. Semiconductor Device Lab.
THEORETICAL AND EXPERIMENTAL STUDIES OF RADIATION-INDUCED DAMAGE TO SEMICONDUCTOR SURFACES AND THE EFFECTS OF THIS DAMAGE ON SEMICONDUCTOR DEVICE PERFORMANCE.
Semiannual progress rept. no. 3, 1 Mar-31 Aug 65.
1965, 37p SDL-3-588-1
Grant NsG-588
NASA-CR-69380

Descriptors: *Metal oxide semiconductor (Mos), *Radiation effect, *Surface property, *Semiconductor device, *Velocity.

N66-16326 **Field 20L**
CFSTI Prices: HC$7.00 MF$1.75
Dept. of Atomic Energy, Bombay (India).
PROCEEDINGS OF THE NUCLEAR PHYSICS AND SOLID STATE PHYSICS SYMPOSIUM. SOLID STATE PHYSICS.
1965, 345p
Presented at Symp. held at Saha Inst. of Nucl. Phys., Calcutta, 8-13 Feb. 1965.

Descriptors: *Atom, *Electron paramagnetic resonance, *Electron-ion recombination, *Nuclear physics, *Solid state physics, *Conference, *Electron transition, *Molecular structure, *Spin-lattic relaxation.

N66-16392 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
Princeton, N. J. RCA Labs.
INTERACTION OF ELECTRONIC CURRENT WITH HYPERSONIC WAVES IN SOLIDS.
Quarterly progress rept. no. 1, 1 Oct - 31 Dec 63.
by R. F. Mayo. 10 Jan 64, 14p
Contract NAS8-11120
NASA-CR-69814

Descriptors: *Microwave frequency, *Cadmium sulfide, *Semiconductor device, *Sound amplification, *Transducer, *Ultrahigh frequency.

N66-16445 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Virginia Univ., Charlottesville. Research Labs. for the Engineering Sciences.
A STUDY OF THIN FILM VACUUM DEPOSITED JUNCTIONS.
Annual status rept. 5 Dec 64-5 Dec 65.
by R. L. Ramey. Dec 65, 34p EE-4012-105-66U
Grant NsG-340
NASA-CR-69863

Descriptors: *Field effect transistor (FET), *Semiconductor, *Thin film, *Vacuum deposition.

N66-16711 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
RCA Labs., Princeton, N. J.
INTERACTION OF ELECTRONIC CURRENT WITH HYPERSONIC WAVES IN SOLIDS.
Technical summary rept. 1 Oct 63 - 30 Sep 64.
by R. F. Mayo, and R. W. Smith. Nov 64, 31p
Contract NAS8-11120
NASA-CR-70028

Descriptors: *Electric current, *Noise spectrum, *Optical measurement, *Oscillation frequency, *Cadmium sulfide.

N66-16723 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Southern Methodist Univ., Dallas, Tex. Thin Films Research Lab.
IMPEDANCE CHARACTERISTICS OF IRRADIATED THIN FILMS.
Progress rept. no. 1 Jun 1-Dec 1 65.
by R. F. Eberline, D. S. Glass, and L. L. Howard. 1 Dec 65, 37p
Grant NgR-44-007-006
NASA-CR-70017

Descriptors: *Deposition, *Infrared spectroscopy, *Bismuth, *Impedance measurement, *Resistance, *Thin film.

N66-17215 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Science and Engineering.
A CALCULATION OF PROTON-INDUCED DAMAGE IN GERMANIUM.
by G. P. Calame, and E. A. Saunders. 1964, 39p
Grant NSg-371
NASA-CR-60859

Descriptors: *Germanium, *Damage, *Proton irradiation, *Semiconductor.

N66-17225 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ON THE ANALYSIS OF THE DIELECTRIC DISPERSION OF FERRITES.
by P. H. Fang. 1964, 11p NASA-TM-X-54959

Descriptors: *Dispersion, *Dielectrics, *Ferrite.

N66-17474 **Field 20L**
CFSTI Prices: HC$3.00 MF$0.75
Research Triangle Inst., Durham, N. C. Solid State Lab.
DIFFUSION PROCESS MODELING.
Technical summary rept. Feb-Aug 65.
by R. P. Donovan. Aug 65, 79p
Contract NAS8-20058
NASA-CR-70455

Descriptors: *Reliability, *Diffusion, *Semiconductor device, *Silicon.

N66-18175 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Philco Corp., Blue Bell, Pa.
RADIATION-RESISTANT DEVICE PHENOMENA.
by W. C. Follmer, and J. P. Spratt. Mar 66, 29p
Contract NASW-997
NASA-CR-389

Descriptors: *Electric property, *Mean free path, *Metal film, *Aluminum oxide, *Electron.

AD-458 027 **See Field 20E**

AD-636 342 **See Field 17A**

AD-636 536 **See Field 7D**

AD-636 565 **See Field 9A**

AD-636 627 **See Field 20E**

AD-636 649 See Field 20C

AD-636 660 See Field 20K

AD-636 674 See Field 14B

AD-636 811 See Field 9A

AD-636 954 See Field 10B

AD-637 067 See Field 13H

AD-637 078 See Field 11B

AD-637 098 See Field 20E

GIC-3362-4 See Field 10B

20M. THERMODYNAMICS

AD-636 315 Field 20M
CFSTI Prices: HC$5.00 MF$1.00
Jet Propulsion Center, Purdue Univ., Lafayette, Ind.
TRANSPIRATION COOLING - ITS THEORY AND APPLICATION.
Technical memo.
by John B. Kelley, and M. R. L'Ecuyer. Jun 66, 167p JPC-422, TM-66-5
Grant NsG-592
Proj. PRF-3837-52-2889
Prepared in cooperation with Purdue Research Foundation, Lafayette, Ind.

Descriptors: (*Porous materials, Cooling), (*Evaporation, *Cooling), State-of-the-art reviews, Theory, Mass transfer, Turbulent boundary layer, Injection, Heat transfer, Skin friction, Surfaces.

Identifiers: Transpiration.

A literature review was made of the various theories proposed and the experimental results obtained in the field of transpiration cooling of turbulent boundary layers. The over-all objective of the review was to examine the extensive literature pertaining to transpiration cooling and to access the state of the art of this cooling scheme in the following subject areas: (1) the theoretical analyses pertaining to the correlation of mass injection rates with surface temperature; (2) the experimental investigations relating to the verification of existing theories and the development of empirical correlations for determining the effects of mass injection on surface heat transfer and skin friction; (3) the theoretical and experimental studies regarding the characteristics of, and flow through, conventional porous materials. (Author)

AD-636 346 Field 20M, 20E, 20K
California Univ., San Diego, La Jolla. Dept. of the Aerospace and Mechanical Engineering Sciences.
INTERACTION OF LASER RADIATION WITH AN ABSORBING SEMI-INFINITE SOLID BAR.
Revised ed.
by S. S. Penner, and O. P. Sharma. 11 Feb 66, 5p
AROD-4479:11, AROD-5133:31
Revision of manuscript submitted 7 January 1966.

Descriptors: (*Rods, *Thermal stresses), (*Lasers, Thermal radiation), Energy, Heat transfer, Stresses, Ablation, Thermodynamics, Photoelasticity.

Thermal stress development in partially transparent rods may be studied by using a laser source for controlled energy deposition. The relevant heat transfer problem was solved for a one-dimensional geometry and some experiments are briefly indicated for studying stress wave evolution prior to ablation and thermal equilibration. (Author)

AD-636 527 Field 20M
Duke Univ., Durham, N. C. Dept. of Physics.
DENSITY, COEFFICIENT OF THERMAL EXPANSION, AND ENTROPY OF COMPRESSION OF LIQUID HELIUM-3 UNDER PRESSURE BELOW 1.2K.
by Charles Boghosian, Horst Meyer, and John E. Rives. 17 Jan 66, 10p
AROD-4357:4

Descriptors: (*Liquefied gases, Helium), (*Helium, Thermodynamics), Density, Thermal expansion, Entropy, Compressive properties, Dielectric properties, Capacitors, Tunnel diodes, Pressure, Cryogenics.

The method of dielectric-constant measurement has been used to determine the density of liquid He3 under pressure between 0.07 and 1.2K. It consists of measuring the resonant frequency of a tunnel-diode oscillator, the LC tank circuit of which includes a capacitor filled with the liquid He3. The tunnel-diode oscillator is kept at low temperature and is described and analyzed in detail. A description is given of the system necessary to keep the pressure of the He3 constant. From the density measurements, the coefficient of thermal expansion and the entropy of compression are derived. The results are compared with earlier work. They are found to be thermodynamically consistent with the data obtained by other methods. (Author)

AD-636 613 Field 20M
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
THE LOW-TEMPERATURE SPECIFIC HEAT OF PALLADIUM CONTAINING INTERSTITIAL HYDROGEN.
by Cleon A. Mackliet, and Albert L. Schindler. 29 Jun 66, 10p NRL-6390
Proj. RR-007-01-46-5408

Descriptors: (*Palladium, Specific heat), (*Cryogenics, Palladium), Hydrogen, Impurities, Thermal properties, Thermodynamics.

Identifiers: Debye temperature.

Specific-heat measurements in the 1.2 to 4.2K range have been carried out on four H-Pd specimens having H/Pd atomic ratios of 0.57, 0.70, 0.81, and 0.88. Corresponding values of gamma (the electronic specific-heat coefficient) are 2.52 1.38, 1.40 and 1.61 millijoules per square degree per gram-atom of palladium; values of (the Debye temperature) are 282, 273, and 267K, respectively. A 'dynamic' method of measurement was necessarily employed because of the occurrence of an exothermic process in these alloys. The interpretation of the data was complicated by the interstitial character of these alloys, but the present results for the electronic specific heat appear to offer unusually direct support for the usual simple band picture of Pd and H-Pd alloys. Special care must be exercised in the interpretation of the Debye temperatures in this case. (Author)

AD-636 665 Field 20M
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A NEW METHOD OF INVESTIGATING RADIATIVE HEAT TRANSFER.
by G. L. Polyak, and V. N. Adrianov. 21 Mar 66, 15p FTD-TT-65-2024
TT-66-61951
Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) n6 p63-9 1964.

Descriptors: (*Thermal radiation, Mathematical analysis), Differential equations, USSR, Tensor analysis.

The article solves the problem of radiation heat transfer in the plane layer of a medium on the basis of a differential equation and compares the results of the solution of this same problem which were obtained by different methods.

AD-636 730 Field 20M
CFSTI Prices: HC$3.00 MF$0.75
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
THERMODYNAMIC PROPERTIES OF NITROGEN FROM 300 TO 5000K AND FROM 1 TO 1000 AMAGATS.
by Martin Grabau, and H. S. Brahinsky. Aug 66, 61p AEDC-TR-66-69
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Nitrogen, *Thermodynamics), High-temperature research, Tables, Density, Graphics, Pressure.

Tables for the thermodynamic properties of equilibrium nitrogen are presented at intervals of log rho = 0.2, the density rho in amagats extending from one to 1000 amagats, and at intervals of 100 deg in temperature from 300 to 5000K. In accordance with full discussion in the text of the report, the compressibility factor Z at 300 and 400K is extrapolated to 1000 amagats by linear extrapolation of log (Z-1) against log rho at constant temperature. At 3000 and 5000K the values of Z are found from published virial coefficients. Interpolations between these extremes of temperature are based on an empirical equation for the pressure-temperature lines at constant density, the form of which fits known data at medium densities and also predicts data at temperatures below 300K. The values of the dimensionless thermal functions E/RT (internal energy) and S/R (entropy) are based on numerical integrations of Z and its derivative (delta Z/delta T) sub, using known values of these functions at one amagat as constants of integration. This method of determining the thermal functions is validated by showing that it reproduces a set of known tables to a high degree of accuracy. (Author)

AD-637 012 Field 20M, 14E
CFSTI Prices: HC$2.00 MF$0.50
Catholic Univ. of America, Washington, D. C. Dept. of Mechanical Engineering.
A QUANTITATIVE SCHLIEREN-GRID METHOD FOR TEMPERATURE MEASUREMENT IN A FREE CONVECTION FIELD.
Technical rept.
by David A. Didion, and Youn Hwan Oh. 15 Jul 66, 49p TR-1
Contract Nonr-2249 (12)

Descriptors: (*Schlieren photography, Temperature), (*Temperature, Measurement), Convection (Heat transfer).

The basic principles of a two dimensional cylindrical schlieren field are developed emphasizing the simplifying assumptions usually found in the literature. The assumption of the straight line path for the light ray in the schliere is replaced by a parabolic path with the index of refraction gradient varying linearly with distance normal to the cylindrical axis. This modification is developed in a form of a correction factor and is evaluated by applying a particular schlieren method to free convection temperature measurements. Results indicate that in regions of high thermal gradients (22000 F/in.) the correction is of the order of 15%. Emphasis is also placed on the particular schlieren method used, that of incorporating a Ronchi grating at the focal point of the second mirror. The corrected average heat transfer coefficient values are compared with shadowgraph and literature interferometer data with agreement being within 1% and 5% respectively. (Author)

AD-637 071 Field 20M, 20D
Cincinnati Univ., Ohio.
MEASUREMENT OF THE HEAT TRANSFER TO A TWO-DIMENSIONAL HYPERSONIC INLET RAMP.
Revised ed.
by Widen Tabakoff, and James D. McDonel. 22 Sep 65, 6p
Contract AF 33 (616)-8453

Proj. AF-7064
ARL-66-0062
Revision of manuscript submitted 8 Jul 65.

Descriptors: (*Heat transfer, *Hypersonic and tunnels), (*Aerodynamic heating, Hypersonic wind tunnels), Fluid mechanics, Thermodynamics.

The heat transfer measurements reported herein were conducted in the 20-inch hypersonic wind tunnel located at the Aerospace Research Laboratories at Wright-Patterson Air Force Base. The testing was conducted at a nominal free-stream Mach number of 14 and a freestream Reynolds number of 0.721 x 1,000,000/ft. Because of the relatively low stagnation temperature of the facility, dissociation effects were not present. The interaction of the boundary layer and shock wave near the leading edge also has an effect on the aerodynamic heating, but consideration of this effect was neglected in the theoretical analysis of this investigation. In addition, radiation to or from the boundary layer was neglected. (Author)

N66-16586 **Field 20M**
CFSTI Prices: HC$3.00 MF$0.75
LTV Astronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
RESULTS OF HEAT TRANSFER TESTS ON SHARP AND SPHERICALLY BLUNTED 4 DEG HALF ANGLE CONICAL MODELS IN A PLASMA JET AND IN A HYPERVELOCITY WIND TUNNEL.
by J. C. Hester, and D. M. Martin. 17 Dec 65, 67
LTV-00.725
Contract NAS1-3915
NASA-CR-66040

Descriptors: *Graphite, *Heat transfer, *Hypervelocity wind tunnel, *Nose cone, *Plasma jet.

For abstract, see T 66 18.

N66-16594 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
ION BOMBARDMENT AND ITS EFFECTS ON THE OPTICAL PROPERTIES OF METALS.
by D. L. Anderson. 1963, 23p NASA-TM-X-57174

Descriptors: *Ion bombardment, *Metal surface, *Optical property, *Sputtering.

N66-17216 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
TOTAL THERMAL CONDUCTIVITY OF PARTIALLY AND FULLY IONIZED GASES.
by W. F. Ahtye. 1965, 10p NASA-TM-X-56059

Descriptors: *Heat flux, *Ionized gas, *Chapman-enskog method, *Thermoconductivity.

N66-17400 **Field 20M**
CFSTI Prices: HC$4.00 MF$1.00
Delaware Univ., Newark.
PROPERTIES OF HYDROGEN-NITROGEN, HYDROGEN-CARBON-DIOXIDE, AND CARBON-DIOXIDE-NITROGEN MIXTURES.
by J. P. Hartnett, C. S. Liu, and H. A. Simon. Feb 66, 135p
Grant NsG-356
NASA-CR-387

Descriptors: *Carbon dioxide, *Hydrogen, *Nitrogen, *Transport property.

N66-17891 **Field 20M**
CFSTI Prices: HC$5.00 MF$1.00
Stanford Research Inst., Menlo Park, Calif.
FEASIBILITY OF STANDARD EVALUATION PROCEDURES FOR ABLATING MATERIALS.
by C. F. Clark, and N. K. Hiester. Mar 66, 151p
Contract NASr-49 (15)
NASA-CR-379

Descriptors: *Ablating material, *Nylon, *Phenol resin, *Material testing, *Teflon.

N66-18462 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EXPERIMENTAL STUDY OF STAGNATION ENTHALPY IN THE LANGLEY HOTSHOT TUNNEL.
by P. L. Lawing. Mar 66, 35p NASA-TN-D-3272

Descriptors: *Hotshot tunnel, *Arc chamber, *Enthalpy.

AD-636 316 **See Field 20L**

AD-636 347 **See Field 20L**

AD-636 354 **See Field 7D**

AD-636 375 **See Field 14B**

AD-636 401 **See Field 20K**

AD-636 496 **See Field 8J**

AD-636 564 **See Field 20C**

AD-636 719 **See Field 7D**

AD-636 808 **See Field 11B**

AD-636 990 **See Field 13A**

AD-637 014 **See Field 20L**

AD-637 059 **See Field 20D**

NYO-187-7 **See Field 13A**

SC-DC-65-1691 **See Field 21B**

20N. WAVE PROPAGATION

AD-636 395 **Field 20N, 20I**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
OBLIQUE WAVE PROPAGATION IN DRIFTING ISOTROPIC HOT PLASMA.
by H. Unz. Sep 65, 28p P-3223
Prepared in cooperation with Kansas Univ., Lawrence. Dept. of Electrical Engineering.

Descriptors: (*Plasma physics, *Electromagnetic waves), Propagation, Magnetohydrodynamics, Partial differential equations, Temperature.

The electro - magneto - plasma - gas - dynamics (EMPGD) equations are summarized for hot, compressible electron gas, with no magneto-static field, drifting with a constant velocity. Using small signal theory for oblique plasma wave propagation, a determinantal equation for the refractive index is found and is applied for particular cases. (Author)

AD-636 493 **Field 20N, 20I**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
OBLIQUE INCIDENCE ON A SEMI-INFINITE COMPRESSIBLE GENERAL MAGNETOPLASMA.
by H. Unz. Aug 65, 30p P-3189

Descriptors: (*Plasma physics, *Electromagnetic waves), (*Magnetohydrodynamics, Electromagnetic waves), Propagation, Polarization, Wave transmission, Reflection, Mathematical analysis.

The problem of a plane electromagnetic wave with arbitrary polarization incident obliquely on a semi-infinite compressible general magnetoplasma has been solved and the corresponding reflection and transmission coefficients have been evaluated. (Author)

AD-636 503 **Field 20N, 4A**
CFSTI Prices: HC$3.00 MF$0.75
Naval Research Lab., Washington, D. C.
TROPOSPHERIC RADIO DUCT METEOROLOGY AT VHF AND UHF IN THEORY AND AS OBSERVED ON A TRIP AROUND THE WORLD, FEBRUARY 8 TO MARCH 15, 1962.
by D. L. Randall. 31 May 66, 73p NRL-6404
Proj. RR-008-01-41-5553

Descriptors: (*Radio transmission, *Troposphere), Very high frequency, Ultrahigh frequency, Radio waves, Propagation, Atmospheric motion, Air mass analysis, Radio communication systems, Meteorological parameters.

Identifiers: Duct propagation.

Vorticity fields showing areas of divergence or convergence in the air-mass flow channels at or above the gradient wind level may be located on a weather map and are theoretically related to the formation or dissipation of elevated radio ducts at vhf and uhf. Theoretical predictions of elevated radio duct formation have been verified by measurements made on a trip around the world, February 8 to March 15, 1962, in a Naval Research Laboratory aircraft. It was verified that ducts result from warm dry air subsiding over cooler moist air in a divergence (anticyclone) area during conditions of stable or increasing pressure. On the basis of the theory and the meteorological measurements, oceanic regions in the world most likely to support radio duct formation at different seasons of the year were mapped. For either the Northern or the Southern Hemisphere, in winter these regions are predominantly in the Torrid Zone but in summer have extended farther into the Temperate Zone and are less prevalent in the Torrid Zone. (Author)

AD-636 933 **Field 20N, 17B, 9E**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
FULL-SCALE PATTERN MEASUREMENTS OF SIMPLE HF FIELD ANTENNAS.
Final rept.
by William A. Ray. May 66, 86p
Contract DA-36-039-sc-90859
Proj. 4172

Descriptors: (*Antenna radiation patterns, High frequency), Measurement, Electrical impedance, Antennas, Radio communication systems, Radio waves, Ionospheric propagation.

The report covers pattern and impedance measurements on typical HF field-expedient antennas--slant wires, inverted L's and dipoles--installed over open farmland in California. Radiation patterns were measured with an aircraft-towed transmitter at elevation angles between 3 and 60 degrees in two polarizations. Several frequencies between 2 and 15 Mc/s were measured on each antenna. Input impedances are given for each antenna over this same frequency range. (Author)

AD-636 965 **Field 20N, 4A**
CFSTI Prices: HC$1.00 MF$0.50
Alaska Univ., College. Geophysical Inst.
ON THE STRONG INFLUENCE OF THE FI LAYER ON MEDIUM TO HIGH LATITUDE HF PROPAGATION.
Scientific rept.
Mar 66, 23p UAG-R-175

Descriptors: (*Radio waves, *Ionospheric propagation), High frequency, Radio trans-

mission, Ionosphere, Ionospheric disturbances, Radio interference.

Identifiers: F region.

During the recent sunspot minimum the F1 layer critical frequency was close to that of the F2 in the medium to high latitudes. This considerably modified HF propagation conditions over long distance paths. At times the F1 layer appeared to block off the propagation of signals in the very oblique F2 modes. High order F2 mode signals were frequently strong and were reflected from large virtual heights. This retardation was produced by the dense, thick F1 layer which existed in the medium to high latitudes during the summer of 1964. The maximum radio frequency for the path was frequently determined by the F1 layer; although this effect has been noted by various workers, it has not been taken into account for communications predictions. One particularly strong and highly delayed type of signal is not readily explainable as a higher order F2 mode because it occurred singly. If it were an ordinary F2 mode trace, its occurrence would lead to the conclusion that the only F2 layer signal propagating was a third or fourth order mode signal on paths of 3500 to 5000 km, and such a conclusion is hard to justify. As an alternative, an F1-F2 ducted mode hypothesis is presented. (Author)

AD-637 011 **Field 20N**
CFSTI Prices: HC$3.00 MF$0.75
Rydbeck Research Associates, Fjaras (Sweden).
WAVE COUPLING IN MULTI-MODE, INHOMOGENEOUS IONIZED MEDIA WITH APPLICATIONS TO ELECTRON STEAM-WHISTLER MODE INTERACTIONS.
by O. E. H. Rydbeck. Feb 66, 63p Scientific-1
Contract AF 61 (052)-864
AFCRL-66-395

Descriptors: (*Whistlers, Propagation), Electron beams, Cyclotron waves, Sweden.

The multi-mode wave equation is broken up in first order coupled wave equations, which are made use of to determine the interaction between electron cyclotron and whistler modes in passive and 'active', i.e. amplifying, barriers. The total energy flow, electro-magnetic and kinetic, can be expressed simply as a Poynting flux in terms of 'reduced' electric (and magnetic) fields. These fields, which are related to the original ones by generalized WKB-type amplitude coefficients, are the quantities to be analytically continued through the barriers. This continuation makes it possible to evaluate, for example, the magnitude of the whistler mode amplification of the system. (Author)

N66-16018 **Field 20N**
CFSTI Prices: HC$1.00 MF$0.50
Auckland Univ. (New Zealand).
RADIO PROPAGATION STUDY.
Semiannual progress rept. 1 Jun - 30 Nov 65.
by J. E. Titheridge. 1965, 9p
Grant NsG-54
NASA-CR-69660

Descriptors: *Beacon satellite, *Ionospheric irregularity, *Radio signal, *Satellite measurement, *Communication, *Radio propagation, *Synchronous communications /syncom/ satellite.

For abstract, see T 66 18.

N66-16704 **Field 20N**
CFSTI Prices: HC$3.00 MF$0.75
Ohio State Univ. Research Foundation, Columbus.
ABSORPTION IN THE SUBMILLIMETER RANGE.
Master's thesis.
by B. J. Lin. 15 Dec 65, 73p Rept. no. 1093-29
Grant NsG-74-60
NASA-CR-70039

Descriptors: *Water vapor, *Atmospheric absorption, *Michelson interferometer, *Submillimeter wave.

N66-17447 **Field 20N**
CFSTI Prices: HC$1.00 MF$0.50
Carleton Univ., Ottawa (Ontario). Faculty of Engineering.
ION EFFECTS OBSERVED IN RADIO WAVE PROPAGATION IN THE IONOSPHERE.
by N. M. Brice. 1965, 23p
Contract DRB-G-2801-21
Prepared in cooperation with DRTE.

Descriptors: *Plasma, *Gas mixture, *Radio wave, *Wave propagation.

AD-636 372 **See Field 20J**

AD-636 377 **See Field 20C**

AD-636 389 **See Field 9E**

AD-636 622 **See Field 20J**

AD-636 790 **See Field 20E**

AD-636 964 **See Field 4A**

AD-636 966 **See Field 4A**

AD-637 001 **See Field 4A**

AD-637 007 **See Field 9B**

AD-637 129 **See Field 4A**

PB-169 609 **See Field 17I**

21B. COMBUSTION AND IGNITION

AD-636 667 **Field 21B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SOME EXPERIMENTAL DATA ON THE EFFECT OF PRESSURE UPON OSCILLATORY SPREADING OF A FLAME IN A TUBE.
by V. V. Kurzhunov. 21 Mar 66, 11p FTD-TT-65-1976
TT-66-61953
Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) n7 p91-5 1964.

Descriptors: (*Propanes, Flames), (*Alkynes, Flames), (*Carbon monoxide, Flames), Oscillation, Scattering, Experimental data, Air, Mixtures, Pipes.

The article introduces experimental data on the boundaries of oscillatory spreading of a flame in CO-, C3H8- and C2 H2-air mixtures, the effect of pressure on the amplitude of displacement of the flame front, the frequencies of the appearing oscillations and the minimum length of the tube at which oscillatory spreading of a flame is possible. (Author)

AD-636 677 **Field 21B, 21G**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON THE KNOCKING CHARACTERISTICS OF AIR-COOLED ENGINES.
by I. V. Markova, and E. S. Polukhin. 26 May 66, 13p FTD-TT-65-1858
TT-66-61961
Unedited rough draft trans. of Avtomobilnaya Promyshlennost (USSR) v30 n9 p5-7 1964.

Descriptors: (*Internal combustion engines, Air cooled), (*Knocking, Internal combustion engines), USSR, Temperature, Combustion chambers, Performance (Engineering).

The temperature level of the walls of the combustion chamber of the engine (within the limits of change of from 135 to 260 C) shows substantial influence on its tendency to knock. With a change in the average temperature of 10, the required octane number of the fuel for the engine MeM3-966 goes up on the average by one point on the octane scale. Turbulation of the charge by means of setting in the combustion chamber of displacers is accompanied by a lowering of the tendency of the engine to knocking. The setting in of a displacer with the area of 24% in the combustion chamber leads to a lowering of the required octane number of the fuel (with t sub head.average= 200 C) by 3.5 points, while increase of the area of the displacer to 36% is accompanied by further lowering of the requirements for the octane number of the fuel by 1.5 points. The means of lessening the tendency to knock in the engine consisting in the lowering of its temperature level, and also in the reducing of the power by means of setting in delay angles of advance of ignition, prove to be more effective with the presence in the combustion chamber of displacers. The change in the degree of compression from 6.5 (value set up for the series engine MeMe-966) to 8 is accompanied by a rise in the required octane number of the fuel by 10 points (Author)

N66-18129 **Field 21B, 20D**
CFSTI Prices: HC$3.00 MF$0.75
Bristol Aircraft, Ltd. (England).
THE FEASIBILITY OF SUPERSONIC COMBUSTION RAMJETS FOR LOW HYPERSONIC SPEEDS.
by R. Hawkins. Sep 65, 66p
Prepared in cooperation with Advanced Propulsion Research Group, rept. no. AP-5329. Prepared for presentation at The Agard Specialists Meeting on the Aerodyn. of Power Plant Installation, AEDC, Tenn. 25-27 Oct 1965.

Descriptors: *Supersonic combustion, *Air breathing engine, *Ramjet engine.

For abstract, see T 66 18.

SC-DC-65-1691 **Field 21B, 20M**
CFSTI Prices: HC$2.00 MF$0.50
Guggenheim Labs. for the Aerospace Propulsion Sciences, Princeton Univ., N. J.
FIRST ANNUAL PROGRESS REPORT ON THE COMBUSTION OF METALS, JULY 1, 1964-JUNE 30 1965.
by J. G. Hansel, M. Zwillenberg, and A. M. Mellor. Aug 65, 38p
Contract AT (30-1)-3451

Descriptors: (*Combustion, Metals), (*Nuclear propulsion, Combustion).

For abstract, see N 20 16.

AD-636 616 **See Field 16D**

AD-637 052 **See Field 21E**

AD-637 118 **See Field 20D**

21C. ELECTRIC PROPULSION

N66-14161 **Field 21C**
CFSTI Prices: HC$6.00 MF$1.50
Electro-Optical Systems, Inc., Pasadena, Calif.
ION ROCKET SYSTEM RESEARCH AND DEVELOPMENT.
Final rept. 24 Feb 64 - 25 Jun 65.
by F. A. Barcatta, G. C. Reid, G. Sohl, R. C. Speiser, and S. Zafran. 30 Dec 65, 252p EOS-4920
Contract NAS3-5250
NASA-CR-54323

Descriptors: *Engine design, *Feed system, *Ion engine, *Zero gravity, *Rocket engine.

21D. FUELS

AD-636 604 Field 21D
CFSTI Prices: HC$1.00 MF$0.50
Monsanto Research Corp., Dayton, Ohio.
DETERMINATION OF PARTS PER BILLION IRON IN HYDROCARBON JET FUELS.
Summary rept. 24 Jan 64-28 Dec 65.
by William G. Scribner, Frank R. Short, H. Clyde Eyster, and Jerome D. Weis. Apr 66, 21p
Contract AF 33 (615)-1317
Proj. AF-3048
Task 304801
AFAPL-TR-66-44

Descriptors: (*Jet engine fuels, Impurities), (*Hydrocarbons, Iron), (*Iron, Microanalysis), Spectroscopy, Organic solvents, N-Heterocyclic compounds, Polycyclic compounds, Fuel filters, Methyl cellulose, Fuel additives, Storage, Contamination, Thermal stability.

Identifiers: Diphenyl phenanthrolines, JP-6 fuels.

The bathophenanthroline spectrophotometric method was adapted for the determination of parts per billion iron in fuels. Particulate iron and soluble iron can be distinguished by analysis before and after filtering the fuel through a 0.45 micron methyl cellulose filter. Noninterference of Santolene-C, methyl cellosolve, phenol-type antioxidants, and metal deactivator is demonstrated. Tenamene-2 interference is avoided by a procedural modification. Trace metals which normally are present in JP-6 fuels also do not interfere. (Author)

AD-637 097 Field 21D
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
JET FUELS.
by N. A. Ragozin. 2 Mar 66, 240p FTD-MT-64-292
TT-66-62044
Edited machine trans. of mono. Reaktivnye Topliva, Moscow, 1963 p1-165.

Descriptors: (*Fuels, Jet engines), USSR, Turbojet engines, Turboprop engines, Physical properties, Chemical properties, Combustion, Performance (Engineering).

The book presents the physicochemical properties and performance characteristics of fuels used for aviation turbojet and turboprop motors in the Soviet Union and in foreign countries. (Author)

AD-637 052 See Field 21E

21E. JET AND GAS TURBINE ENGINES

AD-448 094 Field 21E, 11F
CFSTI Price: HC$3.00
Materials Advisory Board, NAS-NRC, Washington, D. C.
BERYLLIUM USAGE AND DIFFICULTIES IN GAS TURBINE ENGINES.
Progress rept. no. 2.
by J. H. Young, and D. K. Hanink. 1964, 85p
MAB-199-M (2)

Descriptors: (*Beryllium, Gas turbines), (*Gas turbine, Beryllium), Engine structures, Metallography.

For abstract, see T 66 18.

AD-636 298 Field 21E, 20D
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
CALCULATION OF THE DISCHARGE CHARACTERISTICS OF NOZZLE CASCADES.
ATD work assignment no. 88.
by G. A. Filippov, and V. V. Pryakhin. 16 Mar 66, 17p ATD-66-23
TT-66-61878
K Raschetu Raskhodnykh Kharakteristik Soplovykh Apparatov, trans. of Teploenergetika (USSR) n11 p29-34 1965.

Descriptors: (*Gas discharges, *Turbines), Mathematical analysis, Nozzles, Cascade structures, USSR.

Methods are proposed for calculating the effect of various geometric and regime parameters of cascades and also of the steam moisture content on the discharge characteristics of turbine stages. The author makes the following conclusions: (1) The discharge coefficients, determined theoretically from the change in the relative thickness of the exit edges of nozzles and also from the geometrical flow exit angle, pressure ratio at the nozzle, and the relative blade heights, are in good agreement with experimental data and, therefore, the method described in this article may be recommended for paractical application. (2) In nozzles of a single-stage turbine, subcooling of the steam flow occurs independently of the initial liquid content in steam. (3) The change in the relative thickness and height of the exit edges of nozzles quantitatively affect differently the change in the discharge coefficients for superheated and the wet steam. (Author)

AD-636 391 Field 21E
CFSTI Prices: HC$2.00 MF$0.50
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
CWXL-2B EXHAUST SUPPRESSOR EVALUATION TESTING.
Final rept.
by J. L. Frarey. 9 Nov 65, 38p C-2969
Contract NOw-62-1074C

Descriptors: (*Engine mufflers, *Turbojet engines), Exhaust diffusers, Engine noise, Reduction, Exhaust systems, Air cooled, Performance (Engineering), Afterburners, Molybdenum alloys, Rods.

Identifiers: Noise suppressors, Molybdenum alloy TZM, Molybdenum TZC.

This report details the tests conducted and the results obtained from an investigation to determine the durability of a suppressor sound sieve fabricated of a molybdenum alloy TZM and to investigate methods of inducing additional secondary air to provide suppressor body cooling.

AD-636 407 Field 21E
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
TURBOFAN ENGINES-THEIR PRESENT AND FUTURE.
ATD work assignment no. 76.
by V. Starostin. 18 Apr 66, 15p ATD-66-42
TT-66-61892
Turboventilyatornye Dvigateli-Ikh Nastoyashcheye i Budushcheye, trans. of Aviatsiya i Kosmonavtika (USSR) n12 p65-71 1965. Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Turbofan engines, Jet planes), Russia, Afterburners, Supersonic flight, Vertical take-off planes, Jet engine fuels, Weight, Performance (Engineering).

The article describes a way of making turbofan engines by the use of well-designed turbojet engines and discusses the efficiency of such a conversion. The use of an afterburner in a turbofan engine, permitting the use of these engines at high supersonic flight speeds, is also discussed. The author cites specific English and American aircraft now using turbofan engines. A diagram of the X353-5 turbofan engine with a high by-pass ratio is shown; this engine is intended for the XV-5A VERTOL airplane. Turbofan engines with afterburners are being mounted in test aircraft. The author discusses performance of such engines. Future tactical aircraft and the type of engine required for their missions are described. Replacing of kerosene with liquid hydrogen is considered. The importance of reducing the weight of engines in order to increase the capability of airplanes is stressed. (Author)

AD-636 721 Field 21E
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
INVESTIGATION OF GAS-TURBINE EXHAUST DUCTS.
ATD work assignment no. 88.
by A. I. Rasputnis, and N. N. Bukharin. 28 Jul 66, 16p ATD-66-31
TT-66-61965
Issledovanie Vykhlopnykh Patrubkov Gazovykh Turbin, trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Energetika (USSR) n9 p38-46 1965. Rept. on Surveys of Scientific and Technical Literature.

Descriptors: (*Gas turbines, Exhaust systems), (*Exhaust systems, Ducts), USSR, Turbine parts, Gas flow, Fluid mechanics, Design, Aerodynamic characteristics, Effectiveness.

It is cited that the designing of the exhaust duct profile, i.e., the selection of the shape of its meridian- and transfer-cross sections, is done in order to obtain minimal size, weight, hydraulic losses, and minimal nonuniformity in the gas velocity and gas pressure fields with the maximal diffusivity effect. The effect of improving the exhaust duct on the gas turbine's efficiency is shown by examining the gas flow processes in the turbine and exhaust duct simultaneously. The aerodynamic qualities of the exhaust duct were evaluated by blow-through tests using the duct itself or a model of it. The author discusses these tests at some length expressing the results in graph form. The author concludes that the hydraulic losses in the exhaust duct substantially affect the efficiency of a gas turbine; thus, the reduction of the hydraulic drag coefficient of the exhaust duct from 1.83 to 0.90 made it possible to raise the turbine's efficiency 4-5%. The author adds three other conclusions concerning reduction of hydraulic losses in the exhaust duct, the use of toric dividers in the radial-annular deflection region, and the smallest hydraulic drag coefficient obtained with an exhaust duct. (Author)

AD-637 052 Field 21E, 21D, 21B
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ORGANIZATION OF COMBUSTION OF HEAVY FUELS IN COMBUSTION CHAMBERS OF GAS TURBINE INSTALLATIONS.
by M. D. Ermolaev. 13 Apr 66, 25p FTD-MT-65-290
TT-66-62029
Edited machine trans. of Aviatsionnyi Institut, Kazan. Trudy (USSR) v66 p3-17 1961.

Descriptors: (*Aircraft engines, Fuel oils), (*Gas turbine engines, Fuel oils), (*Fuel oils, Combustion), Combustion chambers, Fuel injectors, Atomization, Thermodynamics, USSR.

As a result of adjustment of the process of burning black oil in the combustion chamber of an aircraft gas turbine installation, the following basic conclusions were obtained: (1) Black oil Omega-12 can be effectively burned in a gas turbine with a high heat release rate of the combustion space: Qv = 5,000,000 to 30,000,000 kcal/hr cu.m atm (abs.). The best results obtained during operation of the combustion chamber yielded a coefficient of heat liberation of 0.98-0.99 in the range Alpha = 4.5-10.5. The most effective injector, being a centrifugal two-stage unit, was fully suitable for operation on Omega-12 black oil, without atomizing air, in the range Alpha > 4 and Alpha < 15, at a fuel pressure of > 15 kg/sq cm, and black oil temperature of more than 100C. (2) In the start and low-gas regimes and during operation on lean mixtures with Alpha > 15 and with fuel pressure below 15

kg/sq cm it is necessary to use atomizing air. Consequently, the best injector for atomizing Omega-12 black oil is a combined air-centrifugal three-channel injector. (3) Omega-12 black oil fed into the injector should be heated to a temperature of not less than 100C.

N66-14371 Field 21E
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Research Labs., Melbourne (Australia).
A DEBRIS GUARD FOR TURBINE ENGINES.
by R. Licciardo. Feb 65, 15p ARL/ME-265

Descriptors: *Aircraft hazard, *Debris, *Turbojet engine.

For abstract, see T 66 18.

N66-16280 Field 21E
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration, Washington, D. C.
NACA CONFERENCE ON THE TURBOJET ENGINE FOR SUPERSONIC AIRCRAFT PROPULSION-A COMPILATION OF THE PAPERS PRESENTED.
1951. 162p NASA-TM-X-57165
Presented at Conf. Held Lewis Flight Propulsion Lab., Cleveland, Jul 11, 1951.

Descriptors: *Jet propulsion, *Thrust augmentation, *Turbojet engine, *Air inlet, *Supersonic flight.

21F. NUCLEAR PROPULSION

AD-636 657 Field 21F
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ATOMIC AIRCRAFT ENGINES.
by N. Vasiljevic. 23 May 66, 12p FTD-TT-65-1180
TT-66-61945
Unedited rough draft trans. of Tehnika (Yugoslavia) v18 n3 p426-8 1963.

Descriptors: (*Aircraft nuclear propulsion, Reviews), Yugoslavia, Analysis.

The advantages and disadvantages found in nuclear aircraft engines are discussed. The advantages of atomic aircraft engines over conventional are multifold. Some are of extreme importance to further growth in aircraft developments. Nuclear power plants offer advantages in the following areas: huge quantities of nuclear fuel; great concentration of energy in nuclear fuels; possibility of simultaneous increase in range and speed; greater power output by using one reactor for more than one engine; convenient variance in power; possibility of adapting vertical takeoffs to heavy aircraft. The preeminence of conventional aircraft engines will not be infringed upon any time soon because of the many short-comings inherent in nuclear engines. These can be summarized as follows; require special materials for the reactor and its system; difficulties encountered in reactor construction; small thermal efficiency coefficient; danger of radioactivity; small specific energy for small power; weak economic production effectiveness.

N66-16963 Field 21F
CFSTI Prices: HC$4.00 MF$1.00
National Aeronautics and Space Administration, Washington, D. C.
NUCLEAR ROCKETS BASED ON GRAPHITE REACTOR TECHNOLOGY-THEIR APPLICATIONS AND DEVELOPMENT STATUS.
by H. B. Finger, P. G. Johnson, J. Morrissey, and A. R. Siegel. 1964. 129p NASA-TM-X-54858
Presented at the Agard Lecture Ser. on Nuclear Propulsion, 2nd, Brussels, Sep 28, 1964.

Descriptors: *Graphite, *Mission planning, *Nuclear rocket, *Reactor technology.

For abstract, see T 66 18.

N66-18180 Field 21F
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EXPERIMENTAL STUDY OF EFFECT OF SIMULATED REACTOR CORE POSITION ON NOZZLE HEAT TRANSFER.
by D. R. Boldman, J. W. Coats, R. C. Ehlers, and J. F. Schmidt. Mar 66, 10p NASA-TM-X-1208

Descriptors: *Boundary layer, *Conical nozzle, *Heat transfer, *Reactor core.

AD-636 494 See Field 13J

21G. RECIPROCATING ENGINES

AD-636 945 Field 21G, 20A
CFSTI Prices: HC$1.00 MF$0.50
Naval Scientific and Technical Information Centre, London (England).
THE KINEMATICS OF PISTON SLAP.
by A. Meier. Mar 66, 18p NSTIC/06223/66, NSTIC-Trans-1756
TT-66-62021
Trans. of ATZ; Automobiltechnische Zeitschrift (West Germany) v54 p123-8 1952

Descriptors: (*Pistons, Mechanics), (*Internal combustion engine noise, Pistons), West Germany, Reduction, Motion.

For abstract, see T 66 18.

AD-637 109 Field 21G
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio
METHOD OF CALCULATION OF GENERATOR CLEARANCE OF A LIQUID FUEL INJECTOR.
by N. S. Lamekin. 13 Apr 66, 19p FTD-MT-65-283
TT-66-62052
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Mashinostroenie (USSR) n10 p114-23 1961.

Descriptors: (*Fuel injectors, *Generators), Liquids, Gas flow, Stability, Jets, Atomization.

Determination was made of the length of the first region of instability in a gas jet, flowing from a channel under conditions of underexpansion, for the purpose of obtaining recommendations for the magnitude of clearance in an ultrasonic generator of a low-differential injector. The solution of the gas-dynamical problem is made in the assumption on the correctness of the equation of gas dynamics of a plane potential flow of gas for the case of flow in radial clearance. Results are given of experiments on the study of the fineness of liquid atomization by an injector with an ultrasonic generator, conducted while taking into account recommendations of the author related to the length of the region of instability. (Author)

AD-636 677 See Field 21B

21H. ROCKET MOTORS AND ENGINES

AD-451 695 Field 21H
CFSTI Price: HC$2.00
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
PRELIMINARY STUDY OF AIR AUGMENTATION OF ROCKET THRUST.
by R. L. Perini, R. E. Walker, and G. L. Dugger. Jan 64, 31p TG-545
Contract NOw-62-0604-c

Descriptors: (*Rocket motors (Solid propellant), Thrust augmentor nozzles), (*Thrust augmentor nozzles, Air), Pressure, Density, Interior ballistics, Diffusion, Injection, Specific impulse, Reaction kinetics, Nozzle gas flow, Combustion, Solid rocket propellants.

Assumptions, method of analysis, and results of a parametric study of thrust augmentation of a fuel-rich rocket by air injection and supersonic afterburning are described. The analysis indicates that significant gains in I sub sp should be possible. For the 45 per cent aluminum propellant, 1000 psia chamber pressure, and the Mach 3, 40,000-ft flight conditions assumed, the following effects are indicated. The air injection static pressure should be near 50 psia, if possible. High diffuser kinetic energy efficiency is important, but not crucial. Complete mixing is desirable but not crucial.

N66-14235 Field 21H
CFSTI Prices: HC$3.00 MF$0.75
Aerojet-General Corp., Sacramento, Calif. Liquid Rocket Operations.
AERODYNAMIC DESIGN AND ESTIMATED PERFORMANCE OF A TWO-STAGE CURTIS TURBINE FOR THE LIQUID OXYGEN TURBOPUMP OF THE M-1 ENGINE.
by R. Beer. 19 Nov 65, 64p AGC-8800-12
Contract NAS3-2555
NASA-CR-54764

Descriptors: *Liquid oxygen (LOX), *M-1 rocket engine, *Turbopump, *Two-stage turbine.

For abstract, see T 66 18.

N66-16604 Field 21H
CFSTI Prices: HC$7.65 MF$2.25
Rocketdyne, Canoga Park, Calif.
INVESTIGATION OF COOLING PROBLEMS AT HIGH CHAMBER PRESSURES.
Final rept. 1 Jul 63-31 Mar 65.
by W. S. Hines, F. W. Hoehn, W. S. Miller, A. S. Okuda, and J. D. Seader. May 65, 465p R-6199
Contract NAS8-4011
NASA-CR-70145

Descriptors: *Engine coolant, *Heat transfer, *Cooling system, *Liquid propellant rocket engine.

N66-18176 Field 21H
CFSTI Prices: HC$2.00 MF$0.50
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
CATALYSIS OF HYDROGEN-ATOM RECOMBINATION IN ROCKET NOZZLES.
by J. A. Lordi, and R. E. Mates. Mar 66, 47p
Contract NASr-109
NASA-CR-393

Descriptors: *Atomic recombination, *Catalyst, *Hydrogen, *Nitrogen, *Oxygen, *Rocket nozzle.

AD-636 616 See Field 16D

AD-636 972 See Field 14B

21I. ROCKET PROPELLANTS

N66-14497 Field 21I
CFSTI Prices: HC$1.00 MF$0.50
Weapons Research Establishment (Australia).
EVALUATION OF HIGH TEST PEROXIDE DENSITY FROM CONCENTRATION AND TEMPERATURE.
by J. R. Bentley, and R. H. Weldon. Dec 64, 20p WRE-TM-TRD-72

Descriptors: *Density measurement, *Peroxide, *Rocket fuel tank, *Oxidizer.

AD-636 327 See Field 20K

AD-636 616 See Field 16D

AD-636 910 See Field 6T

22A. ASTRONAUTICS

AD-636 619 Field 22A, 4A, 3B
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
COSMIC RESEARCH.
1966, 236p FTD-TT-65-1985
TT-66-61930
Unedited rough draft trans. of Kosmicheskie Issledovaniya (USSR) v3 n6 p811-952 1965.

Descriptors: (*Astronautics, USSR), (*Geophysics, USSR), (*Astrophysics, USSR), Spacecraft, Space flight, Space environmental conditions, Meteors, Radio astronomy, Space medicine.

Contents: Optimum Acceleration of the Space Vehicle in a Central Field; Optimum Distribution of Correcting Pulses in Single-Parameter Correction; Certain Properties of the Linearized System of Equations of Perturbed Motion and Their Application to the Motion of the Mass Center of a Space Vehicle; Dynamics of the Geomagnetic Trap; Electron and Ion Temperatures in the Ionosphere; Distribution of Electrons with E > 40 kev by Pitch Angles in Inner Belt According to Data from Kosmos 5 Satellite; Certain Questions Regarding Puncture on Collision with Meteoric Particles; The Nature of Radio Noise Emission from the Surface of Venus; Application of Correlation Analysis Methods to Study of the Reactions of the Human Cardiovascular System in Space Flight Aboard a 'Voskhod' Vehicle; Investigation of Kidney Function in the Crew of a 'Voskhod' Spacecraft; Orientation of Man in Space.

AD-636 848 Field 22A
CFSTI Prices: HC$4.00 MF$0.75
Dunlap and Associates, Inc., Santa Monica, Calif. Western Div.
THE ROLE OF PREDICTION IN TRAINING WITH A SIMULATED ORBITAL DOCKING TASK.
Technical rept.
by Charles R. Kelley, Meredith B. Mitchell, Michael J. Wargo, and Daniel J. Prosin. Jun 66, 114p
Contract N61339-1767
Proj. 7903
NTDC-1767

Descriptors: (*Spacecraft docking, *Training), Orbital trajectories, Simulation, Control systems, Mooring.

Identifiers: Prediction.

A review of the literature relating to the role of prediction in manual control resulted in substantial evidence indicating that learning to control vehicles in complex maneuvers such as orbital docking is primarily a matter of learning to predict the future states of the vehicle. The purpose of this project was to: (a) investigate the relation between the ability to predict and manual control skill, and (b) determine the effect of prediction training on learning vehicular control. Two simulated docking experiments were performed. The results supported the hypothesis that ability to control is highly correlated with ability to predict. It was also demonstrated that while prediction training alone is no more effective than standard training, a combination of the two training methods appears to be much more effective than training in either control or prediction alone. It is therefore recommended that manual control training programs incorporate training in prediction. It is also recommended that associated training devices be revised or developed so as to incorporate means of training prediction skills and of measuring prediction capability. (Author)

AD-637 051 Field 22A
CFSTI Prices: HC$4.00 MF$0.75
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE MOON AWAITS US.
by M. Rebrov, and G. Khozin. 7 Apr 66, 114p
FTD-MT-65-74
TT-66-62028
Edited machine trans. of mono. Nas Zhdet Luna, Moscow, 1964, 181p.

Descriptors: (*Astronautics, Lunar craft), USSR, Lunar trajectories, Lunar probes, Moon, Lunar surface vehicles.

Contents: the doors to the universe are opened wide, what does space promise us, a lunar tale, When the dream was born, what we know about the moon, Interesting hypotheses, dangers lurk everywhere, man or robot, how do we leave the earth, the engine of an interplanetary ship, the path to the moon,leading through lunar projects, a robot on the moon, a man on the eudoxus crater, space is calling.

N66-14244 Field 22A
CFSTI Prices: HC$4.00 MF$0.75
Alabama Univ., University.
RESEARCH IN THE AEROSPACE PHYSICAL SCIENCES.
Semiannual rept., 1 Mar-31 Aug 65.
by D. F. Smith. 1 Nov 65, 114p
Grant NsG-381
NASA-CR-68765

Descriptors: *Space science, *University program, *NASA program.

For abstract, see T 66 18.

N66-15597 Field 22A
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
CREW TRANSFER IN ORBITING SPACECRAFT.
by N. Belasco. 1963, 40p NASA-TM-X-57112

Descriptors: *Zero gravity, *Astronaut locomotion, *Manned spacecraft, *Orbital transfer.

N66-15729 Field 22A
CFSTI Prices: HC$5.00 MF$1.50
Honeywell, Inc., St. Petersburg, Fla. Military Products Group.
NASA PATTERN RELEVANCE GUIDE. VOLUME I. GENERAL, SPACE SCIENCE AND UTILIZATION.
by R. H. Parvin. 1 Dec 65, 287p MH-AERO-8-20207-RG
Contract NAS8-20207
NASA-CR-69536

Descriptors: *Space science, *Management planning, *Technology (Gen).

N66-16248 Field 22A
CFSTI Prices: HC$1.00 MF$0.50
Space and Information Systems Div., North American Aviation, Inc., Downey, Calif.
UNMANNED SYSTEMS TO EVALUATE THE MARTIAN ENVIRONMENT.
Condensed summary rept.
by M. G. Boobar, and W. G. Landstrom. Sep 65, 20p SID-65-1173
Contract NAS2-2477
NASA-CR-69997

Descriptors: *Space mission, *Mars environment, *Systems design, *Unmanned spacecraft.

N66-16253 Field 22A
CFSTI Prices: HC$4.00 MF$1.25
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
NUMERICAL RESIDUAL PERTURBATION SOLUTION APPLIED TO AN EARTH SATELLITE INCLUDING LUNI-SOLAR EFFECTS.
by M. C. Eckstein, and J. T. Martin. Sep 65, 191p
SM-49250
Contract NASw-901
NASA-CR-69971

Descriptors: *Mathematical model, *Motion equation, *Numerical integration, *Computer program, *Differential equation, *Earth orbit.

N66-16426 Field 22A
CFSTI Prices: HC$6.00 MF$1.75
National Academy of Sciences-National Research Council, Washington, D. C. Space Science Board.
SPACE RESEARCH-DIRECTIONS FOR THE FUTURE, PART 3.
Feb 66, 328p
Grant NsR-09-012-903
NASA-CR-70003

Descriptors: *Manned space flight, *Physiology, *Satellite, *Aerospace medicine.

N66-16981 Field 22A
CFSTI Prices: HC$3.00 MF$0.50
Arizona State Univ., Tempe. Coll. of Engineering Sciences.
ATTITUDE STABILITY OF A SPINNING PASSIVE SATELLITE IN A CIRCULAR ORBIT.
Semiannual technical progress rept., 1 Jun-30 Nov 65.
by L. Meirovitch. 1965, 54p
Grant NGR-03-001-014
NASA-CR-70262

Descriptors: *Attitude, *Rotating vehicle, *Circular orbit, *Satellite, *Spacecraft stability.

N66-17226 Field 22A
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
THE EQUILIBRIUM ELECTRIC POTENTIAL OF A BODY IN THE UPPER ATMOSPHERE AND IN INTERPLANETARY SPACE.
Doctoral thesis.
by E. C. Whipple Jr. 6 Jun 65, 160p NASA-TM-X-55368, X-615-65-296

Descriptors: *Equilibrium, *Interplanetary space, *Spacecraft trajectory, *Electric potential, *Upper atmosphere.

N66-17476 Field 22A
CFSTI Prices: HC$2.00 MF$0.50
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
T YCHO STUDY GROUP.
Final rept.
15 Dec 65, 45p
Contract NsR-24-005-047
NASA-CR-70458

Descriptors: *Lunar surface, *Space laboratory, *Experiment design, *Lunar landing site.

N66-18179 Field 22A
CFSTI Prices: HC$2.00 MF$0.50
Mount Auburn Research Associates, Inc., Cambridge, Mass.
A COMPUTER PROGRAM FOR CALCULATING THE CHARGE DISTRIBUTION ABOUT A SPACE VEHICLE.
by L. W. Parker. Mar 66, 37p
Contract NAS5-9088
NASA-CR-401

Descriptors: *Charged particle, *Computer program, *Space vehicle, *Ionospheric composition.

AD-636 317 See Field 6S

AD-637 100 See Field 14B

22B. SPACECRAFT

N66-15598 **Field 22B**
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration, Washington, D. C.
REPORT TO THE SPACE SCIENCE BOARD ON THE SPACE SCIENCE AND APPLICATIONS PROGRAMS.
by H. E. Newell. Dec 65, 163p NASA-TM-X-57113

Descriptors: *NASA program, *University program, *Launch vehicle, *Space program.

N66-16188 **Field 22B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SATELLITE SITUATION REPORT, VOLUME 5, NO. 23.
15 Dec 65, 26p NASA-TM-X-57160, X-537-65-217

Descriptors: *Ephemeris, *Satellite observation.

N66-16386 **Field 22B**
CFSTI Prices: HC$3.00 MF$0.75
Sanders Associates, Inc., Nashua, N. H. Instrument Div.
DESIGN OF A RECTILINEAR ACCELEROMETER.
Final rept.
10 Nov 65, 97p
Contract NAS8-20519
NASA-CR-69852CR-69852

Descriptors: *Lateral control, *Structural design, *Accelerometer, *Saturn launch vehicle.

N66-16694 **Field 22B**
CFSTI Prices: HC$1.00 MF$0.50
Electro-Optical Systems, Inc., Pasadena, Calif.
ANALYSIS OF POTENTIAL SECONDARY EXPERIMENTS FOR A SOLAR THERMIONIC FLIGHT TEST VEHICLE. VOLUME IV. SPACECRAFT/EXPERIMENT PAYLOADS.
Final rept. 14 May-15 Oct 65.
19 Nov 65, 23p EOS-6961-Vol-4
Contract NAS7-100
NASA-CR-70089

Descriptors: *Experiment design, *Integration, *Payload.

N66-16695 **Field 22B**
CFSTI Prices: HC$2.00 MF$0.50
Electro-Optical Systems, Inc., Pasadena, Calif.
ANALYSIS OF POTENTIAL SECONDARY EXPERIMENTS FOR A SOLAR-THERMIONIC FLIGHT TEST VEHICLE. VOLUME I. SUMMARY.
Final rept. 14 May-15 Oct 65.
19 Nov 65, 49p EOS-6961-Vol-1
Contract NAS7-100
NASA-CR-70051

Descriptors: *Mission planning, *Solar propulsion, *Test vehicle.

N66-16973 **Field 22B**
CFSTI Prices: HC$4.00 MF$0.75
Ohio Univ., Athens. Coll. of Engineering and Technology.
LEAK DETECTION TECHNIQUE IMPROVEMENT STUDY FOR SPACE VEHICLES.
Interim rept no. 1, 7 Apr 64 - 7 Apr 65.
Apr 65, 101p
Contract NAS8-11199
NASA-CR-70179

Descriptors: *Acoustics, *Leakage, *Radioactive isotope, *Space vehicle, *Tracer, *Solid state device.

N66-17585 **Field 22B**
CFSTI Prices: HC$7.00 MF$1.75
Radio Corp. of America, Princeton, N. J. Astro-Electronics Div.
DEVELOPMENT OF THE SERT I SPACECRAFT.
Summary rept.
1 Feb 66, 323p AED-R-2565
Contract NAS8-2449
NASA-CR-54243

Descriptors: *Space electric rocket test (SERT), *Spacecraft design, *Ground support system, *Ion engine.

N66-18033 **Field 22B**
CFSTI Prices: HC$1.00 MF$0.50
Defence Research Telecommunications Establishment, Ottawa (Ontario). Electronics Lab.
ELECTRONIC AND SYSTEM DESIGN OF THE CANADIAN IONOSPHERIC SATELLITE.
by R. J. Bibby, C. A. Franklin, D. F. Page, and R. F. Sturrock. Dec 65, 23p DRTE-1158

Descriptors: *Command system, *Scientific satellite, *Telemetry, *Electronic equipment, *Ionospheric sounding, *Systems design.

N66-18366 **Field 22B**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Guidance and Control Div.
GUIDANCE AND CONTROL OF THE MARINER PLANETARY SPACECRAFT.
by J. R. Scull. 1965, 33p
NASA-CR-63753
Prepared for presentation at IFAC Symp. on Automatic Control in the Peaceful uses of Space, Norway, 21-24 Jun 1965.

Descriptors: *Guidance and control, *Planetary spacecraft.

AD-636 500 **See Field 14B**

AD-636 530 **See Field 4A**

AD-636 616 **See Field 16D**

AD-636 754 **See Field 9E**

22C. SPACECRAFT TRAJECTORIES AND REENTRY

N66-14483 **Field 22C**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
ORBITAL PARAMETERS OF STAR-RAD (1962 BETA KAPPA) FOR 1962 TO 1964.
by R. J. Tayler. Oct 65, 23p RAE-TR-65223

Descriptors: *Satellite orbit, *Satellite observation.

N66-14668 **Field 22C**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
DRAG COEFFICIENTS OF SPHERICAL SATELLITES.
by G. E. Cook. Oct 65, 36p RAE-TR-65218

Descriptors: *Gas-metal interaction, *Atmospheric composition, *Drag coefficient, *Satellite.

N66-14680 **Field 22C**
CFSTI Prices: HC$1.00 MF$0.50
Radio and Space Research Station, Slough (England).
OPTICAL OBSERVATIONS RECEIVED BY THE PREDICTION SERVICE FOR THE MONTH OF JULY 1965.
1965, 21p

Descriptors: *Optical tracking, *Satellite observation.

N66-15199 **Field 22C**
CFSTI Prices: HC$2.00 MF$0.50
Bellcomm, Inc., Washington, D. C.
A METHOD FOR COMPUTING CHARACTERISTIC VELOCITIES IN AN ORBITAL TRANSFER MANEUVER AND ITS APPLICATION TO THE ESTABLISHMENT OF A LUNAR PARKING ORBIT.
by R. Y. Pei. 7 Dec 65, 36p TM-65-1013-3
NASA-CR-69226

Descriptors: *Lunar orbit, *Orbital transfer, *Parking orbit, *Planetary orbit, *Transfer orbit.

N66-16387 **Field 22C**
CFSTI Prices: HC$6.00 MF$1.50
Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
LUNAR NAVIGATION STUDY, SECTIONS 1 THROUGH 7.
Final rept. Jun 64-May 65.
by L. J. Abbeduto, D. K. Breseke, R. A. Gill, M. E. Amdursky, and J. T. Broadbent. Jun 65, 299p
BSR-1134-Sec-1-7
Contract NAS8-11292
NASA-CR-69859

Descriptors: *Lunar landing module, *Navigation system, *Inertial navigation, *Radio frequency monitoring.

N66-16422 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
Tokyo Univ. (Japan). Inst. of Space and Aeronautical Science.
LINEAR DYNAMIC ANALYSIS OF THE SPINNING AXISYMMETRICAL ROCKET OR VEHICLE.
by A. Azuma. Dec 65, 66p Rept. 399-vol-30-no. 8

Descriptors: *Angular motion, *Dynamic model, *Spin dynamics, *Axisymmetric body, *Rigid body.

N66-16591 **Field 22C**
CFSTI Prices: HC$7.00 MF$1.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DESIGN PARAMETERS FOR BALLISTIC INTERPLANETARY TRAJECTORIES. PART II. ONE-WAY TRANSFERS TO MERCURY AND JUPITER.
by W. E. Bollman, V. C. Clarke Jr, P. H. Feitis, and R. Y. Roth. 15 Jan 66, 328p JPL-TR-32-77
Contract NAS7-100
NASA-CR-70154

Descriptors: *Ballistic trajectory, *Interplanetary trajectory, *Mercury (Planet), *Jupiter (Planet).

N66-16592 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SPACE TRAJECTORIES PROGRAM FOR THE IBM 7090 COMPUTER.
by D. B. Holdridge. 1 Sep 62, 97p JPL-TR-32-223-Rev-1
Contract NAS7-100
NASA-CR-70153

Descriptors: *IBM 7090 computer, *Motion equation, *Space trajectory program, *Spacecraft trajectory, *Computer program.

N66-17228 Field 22C
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
LINEAR ESTIMATION AND RELATED TOPICS.
by R. V. Borchers. Sep 65. 46p NASA-TM-X-55371, X-547-65-367

Descriptors: *Earth orbit, *Orbital element, *Partial differential equation.

N66-17237 Field 22C
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
A SOLUTION FOR SATELLITE ORBIT TIME IN UMBRA AND PENUMBRA WITH APPLICATION TO A LUNAR SATELLITE MISSION ANALYSIS.
by J. D. Kraft. Nov 65. 40p NASA-TM-X-55400, X-470-65-472

Descriptors: *Time measurement, *Flight time, *Lunar satellite, *Satellite orbit calculation, *Umbra.

N66-17276 Field 22C
CFSTI Prices: HC$1.00 MF$0.50
Wyoming Univ., Laramie. College of Engineering.
ORBITAL OPERATIONS STUDY - A TRIADIC DECIMAL DIGIT PRINTER-READER UNIT, PRELIMINARY DESIGN CONSIDERATIONS.
Technical rept no. 6.
by C. N. Rhodine. Dec 65. 18p
Grant NSg-658
NASA-CR-70398

Descriptors: *Printer, *Automatic data processing system, *Reading machine.

N66-17480 Field 22C
CFSTI Prices: HC$1.00 MF$0.50
Wyoming Univ., Laramie. Coll. of Engineering.
ORBITAL OPERATIONS STUDY.
Semiannual progress rept no. 3, 15 May - 14 Nov 65.
28 Dec 65. 15p
Grant NSg-658
NASA-CR-70461

Descriptors: *Automatic data processing system, *Data recorder.

N66-18177 Field 22C
CFSTI Prices: HC$4.00 MF$0.75
Raytheon Co., Sudbury, Mass.
OPTIMUM EARTH RE-ENTRY CORRIDORS.
by H. E. Blanton, and A. Muzyka. Mar 66. 106p
Contract NAS8-5225
NASA-CR-394

Descriptors: *Aerospace vehicle, *Manned spacecraft, *Reentry trajectory, *Steepest ascent method.

AD-636 587 See Field 8E

AD-636 616 See Field 16D

AD-636 971 See Field 4A

22D. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

N66-14067 Field 22D
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
NIKE TOMAHAWK NOSE OPTIMIZATION STUDIES.
by C. I. Hutton Jr, E. E. Mayo, and G. A. Weiskopf. Nov 65. 83p NASA-TM-X-55348, X-721-65-473

Descriptors: *Nike rocket, *Nose cone, *Optimization.

N66-15476 Field 22D
CFSTI Prices: HC$7.27 MF$2.25
GM Defense Research Labs, Santa Barbara, Calif.
SURVEYOR LUNAR ROVING VEHICLE, PHASE I. VOLUME II. APPENDIXES. SECTION II. ELECTRONIC SUBSYSTEMS.
Final rept.
23 Apr 64. 427p TR-64-26-Vol-2-Sect-2
Contracts NAS7-100, JPL-950657
NASA-CR-69396

Descriptors: *Power supply, *Television, *Command control, *Communication system, *Lunar roving vehicle (Lrv), *Surveyor project, *Systems engineering.

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J. WEBER

CURRENT r & d PROJECTS

01 AERONAUTICS

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GQF 989 6 FIELD 20L,20K

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, MASSACHUSETTS

RANDOM VIBRATION IN AEROSTRUCTURES

S. H. CRANDALL

AF-49-638-01314
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DOD-AIR FORCE

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GQF 4327 FIELD 20L,20D

RICE UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, TEXAS

OPTIMUM AERODYNAMIC SHAPES IN THE SUPERSONIC HYPERSONIC AND FREE-MOLECULAR FLOW REGIMES

A. MIELE

AF-AFOSR-0828-65
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DOD-AIR FORCE

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GQF 4329 FIELD 20D

LOADING EFFECTS OF SURFACEDISTORTIONS ON HYPERSONIC WINGS

N. MALMUTH

AF-49-638-01477
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DOD-AIR FORCE

03 ASTRONOMY AND ASTROPHYSICS

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GQF 924 7 FIELD 3A, 3B,12A, 7B

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, ASTRONOMY, CALIFORNIA

COMPUTATIONAL RESEARCH IN ASTROPHYSICS

L. G. HENYEY

AF-AFOSR-0171-65
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DOD-AIR FORCE

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GQF 1281 5 FIELD 3C, 3A, 8N, 8B

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

DETECTION AND GENERATION OF GRAVITY WAVES

J. WEBER

AF-AFOSR-0409-65
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DOD-AIR FORCE

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GQF 3127 3 FIELD 3A,12A

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, MATHEMATICS, ILLINOIS

STABILITY OF STELLAR MODELS

N. R. LEBOVITZ

AF-AFOSR-0712-65
/65- /

DOD-AIR FORCE

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GQF 3228 2 FIELD 3C,12A

INST FOR ADV STUDIES, NEW JERSEY

ANALYSIS IN THE LARGE

M. MORSE

AF-AFOSR-0357-63
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DOD-AIR FORCE

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GQF 3372 2 FIELD 3A, 3B,12A, 7B

UNIV OF CAL-L. A., GRADUATE SCHOOL, ASTRONOMY, CALIFORNIA

CHEMICAL COMPOSITIONS OF GASEOUS NEBULAE AND HYDROGEN-DEFICIENT STARS

L. H. ALLER

AF-AFOSR-0083-65
/65- /

DOD-AIR FORCE

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GQF 3951 FIELD 3C, 3A, 4A, 5A

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, MATHEMATICS, TEXAS

INTERNATIONAL SYMPOSIUM ON HIGH ENERGY ASTRONOMY

E. L. SCHUCKING, E. M. SCHUCKING

AF-AFOSR-0725-65
/65- /

DOD-AIR FORCE

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GQF 4334 FIELD 3A, 4A, 5A,20I

PRINCETON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW JERSEY

RESEARCH IN THE ASTROPHYSICAL SCIENCES

L. SPITZER, M. B. GOTTLIEB

AF-49-638-01555
/65- /

DOD-AIR FORCE

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GQF 4343 FIELD 3A, 7D, 7B

RICE UNIVERSITY, GRADUATE SCHOOL, SPACE SCIENCE, TEXAS

THEORETICAL NUCLEAR ASTROPHYSICS

D. D. CLAYTON

AF-AFOSR-0855-65
/65- /

DOD-AIR FORCE

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GQF 4344 FIELD 3A, 3B,20H, 7D

RICE UNIVERSITY, GRADUATE SCHOOL, SPACE SCIENCE, TEXAS

MEASUREMENT OF GAMMA RAY SPECTRUM OF SUPERNOVA REMNANTS

R. C. HAYMES

AF-AFOSR-0858-65
/65- /

DOD-AIR FORCE

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GQF 4409 FIELD 3C, 3A,20J

AMER MATH SOC, RHODE ISLAND

RELATIVITY THEORY AND ASTROPHYSICS

G. L. WALKER

AF-AFOSR-0834-65
/65- /

DOD-AIR FORCE

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GQF 207318 4 FIELD 3C, 3A,20J

UNIV OF LONDON, UNITED KINGDOM

GRAVITY AND GENERAL RELATIVITY PHYSICS

H. BONDI

AF-61-052-00877
/65- /

DOD-AIR FORCE

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GQF 207421 FIELD 3C, 3A, 5A,20J

SYRACUSE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

QUANTIZATION OF THE GRAVITATIONAL FIELD

P. G. BERGMANN

AF-33-615-02238
/65- /

DOD-AIR FORCE

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GQF 258023 1 FIELD 3A, 3B, 4A

WENTWORTH INST., BOS, MASSACHUSETTS

ANALYSIS OF RADIO ASTRONOMY DATA TAKEN AT SAGAMORE HILL

M. J. DAVIN

AF-19-628-03282
/65- /

DOD-AIR FORCE

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GQF 258025 1 FIELD 3A, 3B, 9+, 9A

OHIO STATE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, OHIO

EXPERIMENTAL STUDY TO DETERMINE SPECTRA + LOCATION OF RADIO SOURCE STARS AT 200 TO 2KMC/S

J. D. KRAUS

AF-19-628-03310
/65- /

DOD-AIR FORCE

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GQF 258235 1 FIELD 3A, 3B

UNIVERSITY OF OSLO, NORWAY

OBSERVATION + ANALYSIS OF SOLAR NOISE STORMS STUDY SUNSPOTS + OPTICAL-RADIO PHENOMENA

E. JENSEN

AF-61-052-00743
/65- /

DOD-AIR FORCE

****

GQF 258301 1 FIELD 22C, 3A, 4A

MICROSCOPIC STUDIES OF EXT

C. L. HEMENWAY

AF-19-628-03848
/65- /

DOD-AIR FORCE

****

GQF 258616 1 FIELD 3B, 4A,20F

UNIV OF HULL, UNITED KINGDOM

DESIGN + MODIFY GROUND-BASED AND BALLOON-BORNE SPECTROMETRIC TECHNIQUES FOR LUNAR RESEARCH

J. RING

AF-61-052-00751
/65- /

DOD-AIR FORCE

****

GQF 258758 2 FIELD 3A,20D

FLUID MODELING AND MATHEMATICAL SUPPORT FOR LABORATORY ASTROPHYSICS PROGRAM

K. L. ROGERS

AF-19-628-02837
/65- /

DOD-AIR FORCE

****

GQF 259405 3 FIELD 3A, 3B, 4A,20J

UNIVERSITY OF LIEGE, BELGIUM

RELATE SOLAR ACTIVITY COMETRY SPECTRA AND TERRESTRIAL PHENOMENA

P. SWINGS

AF-61-052-00587
/65- /

DOD-AIR FORCE

****

GSP 2458 FIELD 4A, 5A

UNIVERSITY NEW MEXICO, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, NEW MEXICO

BALLOON INVESTIGATION OF SOLAR NEUTRONS

C. P. LEAVITT

NSF-GP-4686
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

****

GSP 2460 FIELD 3A, 5A

US, SMITHSONIAN INST, DIST OF COLUMBIA

STELLAR ATMOSPHERES

C. A. WHITNEY

NSF-GP-4318
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

****

GSP 2548 FIELD 3A, 4A

NATL CTR ATMOSPH RES, BOULDER, COLORADO

ROTATIONALLY FORCED EJECTION OF MATTER FROM STARS

B. STILLER, W. D. ROBERTS

NSF-GP-4668
9/64- 9/65

NSF-PHYSICAL SCIENCES DIVISION

****

GSS 702 FIELD 3A

THE MEDIEVAL HEBREW TRADITION IN ASTRONOMY

B. R. GOLDSTEIN

NSF-GS-821
6/65- 6/66

NSF-SOCIAL SCIENCES DIVISION

****

GSS 876 FIELD 3A

JOHNS HOPKINS UNIV, GRADUATE SCHOOL, HISTORY OF SCIENCE, MARYLAND

A HISTORY OF ASTROPHYSICS

H. WOOLF

NSF-GS-776
9/65- 9/66

NSF-SOCIAL SCIENCES DIVISION

04 ATMOSPHERIC SCIENCES

****

GH 69 1 FIELD 4A, 5A

UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

CONDUCT ANALYTICAL, THEORETICAL, AND EXPERIMENTAL STUDIES OF GEOMAGNETICALLY TRAPPED PARTICLES

C. E. MCILWAIN

NASA-NASR-116-SI-2
10/63-12/64

NASA

****

GH 1162 3 FIELD 4A, 5A

JOHNS HOPKINS UNIV, GRADUATE SCHOOL, PHYSICS, MARYLAND

CONDUCT ROCKET AND LABORATORY EXPERIMENTS, AND ANALYSIS ON THE ULTRAVIOLET SPECTRA

G. H. DIEKE

NSG-193
1/65-12/65

NASA

****

GQA 297 1 FIELD 4A, 8+, 9+,20J

OPTICAL RADAR INVESTIGATIONS OF THE UPPER ATMOSPHERE

G. FIOCCO

DA-36-039-AMC-03200E
/65- /

DOD-ARMY

****

GQF 32 8 FIELD 4A, 8+, 9+

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

WAVE PARTICLE INTERACTIONS IN THE MAGNETOSPHERE

R. A. HELLIWELL

AF-AFOSR-0783-65
/65- /

DOD-AIR FORCE

****

GQF 1210 4 FIELD 3A, 4A, 5A,20H

WASHINGTON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MISSOURI

PRIMARY COSMIC RAY COMPOSITION AND TIME VARIATION

M. W. FRIEDLANDER

AF-AFOSR-0382-64
/65- /

DOD-AIR FORCE

****

GQF 1301 4 FIELD 3A, 4A, 5A, 7B

MASS INST OF TECHNOL, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

BOLIVIAN AIR SHOWER JOINT EXPERIMENT

G. W. CLARK

AF-AFOSR-0546-65
/65- /

DOD-AIR FORCE

****

GQF 258014 1 FIELD 4A, 9+, 9A

MAINTAIN AND OPERATE IONOSPHERIC SOUNDER SITE AT MAYNARD MASS

D. DAVIDSON

AF-19-628-03267
/65- /

DOD-AIR FORCE

****

GQF 258016 1 FIELD 4A, 7B

RESEARCH + EXPERIMENTAL STUDY OF RADIO WAVE PROPAGATION ON N-S LINE FROM SWEDEN-PUERTO RICO-PERU-URUGUAY

B. DUENO

AF-19-628-03999
/65- /

DOD-AIR FORCE

****

GQF 258024 2 FIELD 4A

KIRUNA GEOPHYS OBSERV, SWEDEN

EXPERIMENTAL STUDY OF AURORAL IONO SPHERE AT VHF + ELF USING RADIOASTRONOMY TECHNIQUES

B. HULTQVIST

AF-61-052-00678
/65- /

DOD-AIR FORCE

****

GQF 258026 1 FIELD 4A

UNIV OF ATHENS, GREECE

RESEARCH ON THE IONOSPHERE USING TRANSMISSIONS FROM ACTIVE SATELLITES

. ANASTASSIADES

AF-61-052-00754
/65- /

DOD-AIR FORCE

****

GQF 258028 1 FIELD 3A, 4A

UNIVERSITY OF GHANA, GHANA

EXPERIMENTAL STUDIES OF IONOSPHERIC CHARACTERISTICS BY OBSERVATION OF SATELLITE + RADIO + STAR EMISSI

J. R. KOSTER

AF-61-052-00800
/65- /

DOD-AIR FORCE

****

GQF 258029 1 FIELD 4A

UNIV OF PARIS, FRANCE

EXPERIMENTAL STUDY OF THE IONOSPHERE USING SATELLITE TRANSMISSIONS FARADAY ROTATION MEASURES

E. VASSY

AF-61-052-00761
/65- /

DOD-AIR FORCE

****

GQF 258045 1 FIELD 1C

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

REDUCTION AND ANALYSIS OF FLIGHT TEST DATA RELATING ELECTRIC FIELD MEASUREMENTS TO CLEAR AIR TURBULANCE

J. E. NANEVICZ

AF-19-628-03308
/65- /

DOD-AIR FORCE

****

GQF 258058 FIELD 4A

FABRICATION + TEST OF SELECTED PORTIONS OF PROTOTYPE ADVANCED UPPER AIR SOUNDING SYSTEM

J. KIRCH

AF-19-628-04215
/65- /

DOD-AIR FORCE

****

GQF 258071 1

ARACON GEOPHYSICS CO, CONCORD, MASSACHUSETTS

STUDY OF THREE DIMENSIONAL SMALL SCALE AIR MOTIONS IN STORM CONDITIONS

A. GLASER

AF-19-628-03893
/65- /

DOD-AIR FORCE

****

GQF 258166 1 FIELD 8+, 9+, 9A

TECHNICAL OPERATIONS, MASSACHUSETTS

DEVELOPMENT OF LASER FOG DISDROMETER FOR SPHERICAL AND NON-SPHERICAL DROPSIZE MEASUREMENTS

G. B. PARRENT

AF-19-628-03813
/65- /

DOD-AIR FORCE

****

GQF 258279 2 FIELD 4A

OPTICAL STUDIES OF AIRGLOW + TWILIGHT SKY ASSOCIATED WITH THE AURORA

A. V. JONES

AF-19-628-02829
/65- /

DOD-AIR FORCE

****

GQF 258289 2 FIELD 4A

IONOSPHERIC INST BRIES, GERMANY

CONDUCT THEORETICAL + EXPERIMENTAL STUDIES OF IONOSPHERIC WINDS DRIFT DIRECTION + VELOCITY

K. RAWER

AF-61-052-00672
/65- /

DOD-AIR FORCE

****

GQF 258363 1 FIELD 4A

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

DEVELOP TECHNIQUES FOR MEASUREMENT OF IONOSPHERIC WINDS AND AIR DENSITIES BY METEOR TRAIL OBSERVATION

A. M. PETERSON

AF-19-628-03996
/65- /

DOD-AIR FORCE

****

GQF 258453 FIELD 4A, 8+, 9+, 12A

THEORETICAL + EXPERIMENTAL STUDIES OF ARCTIC PROPAGATION WITH EMPHASI ON COMPLEX MODES

. NONE

AF-19-628-05180
/65- /

DOD-AIR FORCE

****

GQF 258475 2 FIELD 4A, 8+, 9+, 5A

BOSTON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

STUDY OF EM PROPERTIES OF THE ATMOSPHERE USING RADIO ASTRONOMY TECHNIQUES

G. HAWKINS

AF-19-628-02350
/65- /

DOD-AIR FORCE

****

GQF 258502 3 FIELD 4A

EXPERIMENTAL DET OF IONOSPHERIC CHARACTERISTICS USING SATELLITE RADIO TRANSMISSION

D. J. LINEHAN

AF-19-628-00245
/65- /

DOD-AIR FORCE

****

GQF 258503 2 FIELD 4A

ANALYTICAL STUDIES OF IONOSPHERIC IRREGULARITIES USING DATA FROM SEVERAL SOURCES

M. G. MORGAN

AF-19-628-02493
/65- /

DOD-AIR FORCE

****

GQF 258564 2 FIELD 3A, 4A, 5A

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, PHYSICS, ILLINOIS

RESEARCH ON COSMIC RADIATION INCLUDING OPERATION OF NEUTRON MONITORING NETWORK

J. A. SIMPSON

AF-19-628-02473
/65- /

DOD-AIR FORCE

****

GQF 258590 1 FIELD 4A

OPERATE CONTINUOUS VARIABLE AREA MAGNETOGRAPHS AND PERFORM RELATED RESEARCH

L. A. GIESECKE

AF-AFOSR-0653-64
/65- /

DOD-AIR FORCE

****

GQF 258625 2 FIELD 4A, 7B

UNIVERSITY OF LIEGE, BELGIUM

HIGH RESOLUTION ATMOSPHERIC IR ABSORPTION AND SKY BACKGROUND EMISSION INTERFEROMETRIC STUDIES

M. V. MIGEOTTE

AF-61-052-00685
/65- /

DOD-AIR FORCE

****

GQF 259221 FIELD 4A,12A, 8E,20H

WICHITA STATE UNIV, GRADUATE SCHOOL, PHYSICS, KANSAS

SIMULTANEOUS MEASUREMENTS OF GEOMAGNETIC FLUCTUATIONS AND LUMINESCENCE FROM BRIGHT METEOR TRAILS

A. W. JENKINS

AF-19-628-04768
/65- /

DOD-AIR FORCE

****

GQF 259272 FIELD 22C,12A, 8E

DEVELOP MATHEMATICAL STATISTICAL TECHNIQUES FOR TROPOSPHERIC WIND PRESENTATION

• NONE

AF-19-628-05170
/65- /

DOD-AIR FORCE

****

GQF 259447 FIELD 7A, 4A,20J

WARNER + SWASEY CO.,, NEW YORK

STUDY OF TEMPERATURE DEPENDENCE OF SPECTRAL LINE WIDTHS AND INTENSITIES IN ATMOSPHERIC GASES

M. BARROW

AF-19-628-04989
/65- /

DOD-AIR FORCE

****

GQF 259524 FIELD 3A, 3B, 4A

TECH FOR + STUDY ATTENUATION OF SOLAR BEAM IN ATMOS IN 029-3.5 M REG + RADIATIVE TRANS IN 3.5-35 M REG

• NONE

AF-19-628-05210
/65- /

DOD-AIR FORCE

****

GQF 259674 FIELD 7C,21B,21I, 4A

DEVELOPMENT + FABRICATION OF A COMBUSTIBLE ROCKET PAYLOAD FOR CHEMILUCENT EXPERIMENTS

• NONE

AF-19-628-05046
/65- /

DOD-AIR FORCE

****

GQF 259750 2 FIELD 4A,20D,10B

STUDIES TO DEVELOP A PHYSICAL MODEL OF ROCKET EXHAUST STRUCTURE AND INTERACTION WITH UPPER ATMOSPHERE

• NONE

AF-19-628-02369
/65- /

DOD-AIR FORCE

****

GQF 259780 1 FIELD 4A

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

STUDY RF SCATTERING FROM IONIZED UPPER ATMOS PERTURBATION ASSOCIATED WITH MISSILE PASSAGE

• NONE

AF-19-628-03296
/65- /

DOD-AIR FORCE

****

GQQ 595252 FIELD 4A,12A,20J, 5A

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

MICROMETEORITE BACK SCATTERING

U. VANNIJK, C. O. ALLEY, S. K. POULTNEY

SD-101
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

****

GSP 2459 FIELD 4A,20J, 5A

UNIV OF PITTSBURGH, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

RESONANCE RADIATION EXCITATION IN THE AIRGLOW

T. M. DONAHUE

NSF-GP-443S
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

05 BEHAVIORAL AND SOCIAL SCIENCES

****

GQF 3414 2 FIELD 9D, 5C,12A

HERNER + CO WASH, DIST OF COLUMBIA

STUDY OF INDEXING PROCEDURES AND MECHANISMS

S. HERNER

AF-49-638-01424
/65- /

DOD-AIR FORCE

****

GQF 3456 3 FIELD 9•

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

ARECIBO ADVISORY COMMITTEE

R. N. BRACEWELL

AF-49-638-01181
/65- /

DOD-AIR FORCE

06 BIOLOGICAL AND MEDICAL SCIENCES

GQF 1265 5 FIELD 12A

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, PSYCHOLOGY, MICHIGAN

THEORETICAL FRAMEWORKS FOR PATTERN RECOGNITION PROBLEMS

W. P. TANNER

AF-AFOSR-0367-65
/65- /

DOD-AIR FORCE

****

GQF 3136 3 FIELD 7C, 7A, 7D

GEORGIA INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, GEORGIA

NUCLEIC ACID CHEMISTRY

J. R. COX

AF-AFOSR-0558-64
/65- /

DOD-AIR FORCE

****

GQF 3751 1 FIELD 9•,12A, 9D

GENERAL ELECTRIC CO, SANTA BARBARA, CALIFORNIA

MULTILEVEL ADAPTIVE THRESHOLD LOGIC FOR PATTERN RECOGNITION

A. T. EWALD

AF-49-638-01520
/65- /

DOD-AIR FORCE

07 CHEMISTRY

****

GQF 3837 FIELD 7A, 7D,20J

CAL INST OF TECHNOLOGY, SCHOOL OF ENGINEERING, CHEMISTRY + CHEM ENGIN, CALIFORNIA

TRANSFER OF EXCITATION IN SOLUTION

G. S. HAMMOND

AF-49-638-01479
/65- /

DOD-AIR FORCE

****

GQF 3841 FIELD 7C, 7D

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, CHEMISTRY, FLORIDA

MULTICHARGE AROMATIC IONS

M. A. BATTISTE

AF-AFOSR-0738-65
/65- /

DOD-AIR FORCE

****

GQF 3849 FIELD 7C, 7D,20J, 7B

UNIVERSITY OF IOWA, GRADUATE SCHOOL, CHEMISTRY, IOWA

REACTIONS AND STRUCTURES OF METAL•OLEFIN COMPLEXES AND RELATED SUBSTANCES

J. P. DOYLE, N. C. BAENZIGER

AF-AFOSR-0763-65
/65- /

DOD-AIR FORCE

****

GQF 3919 FIELD 7C, 7D,20J

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

REACTIONS OF MOLECULES IN EXCITED ELECTRONIC STATES WITH PARAMAGNETIC GASES

W. A. NOYES

AF-AFOSR-0778-65
/65- /

DOD-AIR FORCE

****

GQF 3921 FIELD 7C, 7D, 7A, 7B

UNIV OF MASSACHUSETTS, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

ELECTROCHEMISTRY OF TRANSITION METAL IONS IN ACETONITRILE

J. W. OLVER

AF-AFOSR-0777-65
/65- /

DOD-AIR FORCE

****

GQF 4360 FIELD 7D,20J,20F,20L

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, CHEMISTRY, MICHIGAN

THE EXCITED STATES OF URANIUM AND HEAVY

METALS

T. DUNN

AF-AFOSR-0865-65
/65- /

DOD-AIR FORCE

****

GQF 4369 FIELD 7C, 7D, 7B

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, OHIO

PHOTOCHEMICAL GENERATION OF DIVALENT CARBON DERIVATIVES

A. PADWA

AF-AFOSR-0820-65
/65- /

DOD-AIR FORCE

****

GQF 4386 FIELD 7C, 7A, 7D,20M

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, CHEMISTRY, COLORADO

VAPOR PHASE CALORIMETRY

J. O. PARK, J. R. LACHER

AF-AFOSR-0810-65
/65- /

DOD-AIR FORCE

****

GQF 4387 FIELD 7C, 7D,20J, 7B

TUFTS UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

INORGANIC APPLICATIONS OF NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY

T. E. HAAS

AF-AFOSR-0859-65
/65- /

DOD-AIR FORCE

****

GQF 4394 FIELD 7C, 7A, 7D,20J

NEW YORK UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

SIGMA PI REARRANGEMENT

M. TSUTSUI, M. *. TSUTSUI

AF-AFOSR-0824-65
/65- /

DOD-AIR FORCE

****

GQF 4396 FIELD 7C, 7D,20L

UNIV OF QUEENSLAND, AUSTRALIA

CHARGE AND ENERGY TRANSFER IN ORGANIC SYSTEMS

L. E. LYONS

AF-AFOSR-0863-65
/65- /

DOD-AIR FORCE

****

GQF 4407 FIELD 5A,20J, 7B

NATL ACAD SCI NAT RE, DIST OF COLUMBIA

RESEARCH ON INORGANIC CHEMICAL NOMENCLATURE

E. WICHERS

AF-AFOSR-0890-65
/65- /

DOD-AIR FORCE

****

GQF 4413 FIELD 7C, 7D,20J, 7B

UNIV OF SOUTHERN CALIF, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

MICROWAVE SPECTROSCOPY OF BORON COMPOUNDS

R. A. BEAUDET

AF-AFOSR-0849-6R
/65- /

DOD-AIR FORCE

****

GQF 4416 FIELD 7C, 7A, 7D

LEHIGH UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

NUCLEOPHILIC DISPLACEMENTS BY ORGANOPHOSPHORUS COMPOUNDS

I. J. BOROWITZ

AF-AFOSR-0938-65
/65- /

DOD-AIR FORCE

****

GQF 4417 FIELD 19D, 7A,20J

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

ULTRAPID-SCAN SPECTROSCOPIC OF REACTIVE MOLECULES

G. C. PIMENTEL

AF-AFOSR-0852-65
/65- /

DOD-AIR FORCE

****

GQF 4463 FIELD 7C, 7D

UNIVERSITY OF IDAHO, GRADUATE SCHOOL, CHEMISTRY, IDAHO

REARRANGEMENTS OF CARBONIUM IONS AND FREE RADICALS IN THE BICYCLO /3.1.0/ HEXYL SYSTEM

P. K. FREEMAN

AF-AFOSR-0875-65
/65- /

DOD-AIR FORCE

****

GQF 4472 FIELD 7C, 7D, 7B

WEIZMANN INST OF SCI, ISRAEL

MECHANISM OF NITROGEN FIXATION BY ULTRASONIC RADIATION IN WATER

M. ANBAR

AF-EOAR-0087-65
/65- /

DOD-AIR FORCE

****

GQF 4494 FIELD 7C,21B,21I,20M

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

THERMODYNAMICS OF ORGANIC DERIVATIVES OF THE LIGHTER ELEMENTS

D. R. DOUSLIN

ISSA-00007-65
/65- /

DOD-AIR FORCE

****

GQF 4518 FIELD 7C, 7D,20J, 7B

UNIV OF CHILE, CHILE

STUDY OF CYCLOPROPANE DERIVATIVES CONTAINING FLUORINE

F. CASES

AF-AFOSR-0892-65
/65- /

DOD-AIR FORCE

****

GQF 4523 FIELD 7A, 7D,20J

GENERAL DYNAMICS CORP, SAN DIEGO, CALIFORNIA

CHEMICAL REACTIONS USING MODULATED ATOMIC BEAM TECHNIQUES

J. N. SMITH

AF-49-638-01559
/65- /

DOD-AIR FORCE

****

GQF 207173 3 FIELD 7C, 7D, 7B

MONSANTO RES. CORP., OHIO

INVESTIGATION OF HIGH TEMPERATURE GAS CHROMOTOGRAPHY SUBSTRATES

W. D. ROSS

AF-33-615-01176
/65- /

DOD-AIR FORCE

****

GQF 207179 5 FIELD 7C, 7A, 7D,20M

BATTELLE MEMORIAL IN, OHIO

PYROLYTIC MECHANISMS IN ORGANOSILICON CHEMISTRY

A. LEVY

AF-33-615-01807
/65- /

DOD-AIR FORCE

****

GQF 207190 3 FIELD 7C, 7D,20M, 7B

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, CHEMISTRY, COLORADO

COORDINATION CHEMISTRY OF THE GROUP IV AND V METALS

R. N. KELLER

AF-33-657-08321
/65- /

DOD-AIR FORCE

****

GQF 207204 6 FIELD 7C, 7A, 7D,20M

UNIV OF BARCELONA, SPAIN

A STUDY OF THE SYNTHESIS AND PROPERTIES OF ALKAROMATIC CHLOROCARBONS

M. BALLESTER

AF-61-052-00749
/65- /

DOD-AIR FORCE

****

GQF 207205 8 FIELD 7C, 7D,19D,21B

UNIVERSITY OF LOUVAIN, BELGIUM

MECHANISM OF IONIZATION PROCESSES IN FLAMES

A. VANTIGGELEN
AF-EOAR-0082-65
/65- /

DOD-AIR FORCE

****

GQF 207209 2 FIELD 7D

UNIV OF LONDON, UNITED KINGDOM

CHROMATOGRAPHY AND SOLVENT EXTRACTION OF ORGANOMETALLIC COMPLEXES

D. A. PANTONY

AF-61-052-00663
/65- /

DOD-AIR FORCE

****

GQF 284658 5 FIELD 7C, 7D,20M,20J

UNIV OF LONDON, UNITED KINGDOM

ORGANOMETALLIC COMPOUNDS AND POLYMERS BASED ON ML

D. C. BRADLEY

AF-61-052-00894
/65- /

DOD-AIR FORCE

****

GQF 284725 1 FIELD 7D,12A,20J, 7B

ATOMIC ABSORPTION SPECTROSCOPY

R. V. STUART

AF-33-615-01519
/65- /

DOD-AIR FORCE

****

GQF 284930 FIELD 7D,20M,20J,20F

ISR INST OF TECHNOLOGY, ISRAEL

RESEARCH ON MATRIX ISOLATION

D. SCHNEPP

AF-61-052-00824
/65- /

DOD-AIR FORCE

****

GQQ 595143 16 FIELD 7C, 7D,20M, 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

CRITICAL PHENOMENA

O. K. RICE, B. W. DAVIS, L. IKENBERRY

SD-100
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

****

GQQ 595147 FIELD 7C, 7D,20J, 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

STEREOELECTROCHEMISTRY

R. W. MURRAY, M. KODAMA

SD-100
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

****

GQQ 595157 2 FIELD 7C, 7A, 7D,20J

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, PHYSICS, NORTH CAROLINA

THE NATURE OF CHARGE TRANSPORT IN ORGANIC SUBSTANCES

M. SILVER, R. C. JARNAGIN

SD-100
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

****

GSB 4512 FIELD 7C, 7D, 7A,20J

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

ELECTRIC DICHROISM OF MACROMOLECULES

K. E. VANHOLDE

NSF-GB-4549
12/65-12/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

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GSB 4513 FIELD 7C, 7D, 7A,20J

ILLINOIS INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

CONFORMATION AND ASSOCIATION IN PEPTIDES

K. D. KOPPLE

NSF-GB-4514
12/65-12/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

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GSE 595 2 FIELD 7D, 7A, 7B

UNIVERSITY OF DENVER, SCHOOL OF ENGINEERING, METALLURGY, COLORADO

PRECIPITATION IN ALKALI HALIDE SOLID SOLUTIONS

J. B. NEWKIRK

GK-786
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 780 FIELD 7A, 7D

UNIV OF MINNESOTA, SCHOOL OF PHARMACY, PHARMACEUTICAL SCIENCE, MINNESOTA

SEGREGATION KINETICS OF PARTICULATE SOLIDS SYSTEMS

E. G. RIPPIE

NSF-GK-471
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 869 FIELD 7C,20M,20J

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, CALIFORNIA

THERMODYNAMIC PROPERTIES AND INTERMOLECULAR FORCES OF MATERIALS AT LOW TEMPERATURES

J. M. PRAUSNITZ

NSF-GK-446
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 899 FIELD 7C, 7A, 7D,12A

UNIV OF PENNSYLVANIA, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, PENNSYLVANIA

THE SORPTION OF PURE VAPORS AND VAPOR MIXTURES IN MICROPOROUS SOLIDS

A. L. MYERS

NSF-GK-720
12/65-12/66

NSF-ENGINEERING SCIENCES DIVISION

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GSP 2208 FIELD 7D

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

TRANSMISSION AND INFLUENCE OF POLAR EFFECTS

L. M. STOCK

NSF-GP-4398
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2434 FIELD 7C, 7D, 5A

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

ELECTRICAL AND OPTICAL PROPERTIES OF ORGANIC SYSTEMS

R. C. JARNAGIN, M. SILVER

NSF-GP-4336
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2444 FIELD 7C, 7D, 5A,20L

WASHINGTON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MISSOURI

PHASE TRANSITIONS IN CRYSTALLINE FREE RADICALS

J. H. BURGESS, R. S. RHODES

NSF-GP-4212
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

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GUE 82 2 FIELD 7D,20M, 8H, 7B

MONSANTO CHEMICAL CO, SANTO CHEMICAL CO EVER, MASSACHUSETTS

PROPERTIES OF SALINE WATER SYSTEMS

B. M. FABUSS

SW-14-01-0001-294
10/64-10/65

INTERIOR-OFFICE OF SALINE WATER

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GUE 146 FIELD 7D

GENERAL DYNAMICS CORP, SAN DIEGO, CALIFORNIA

DESIGN STUDY OF PROTOTYPE FOR MILLION GPD REVERSE OSMOSIS PLANT

U. MERTEN, H. MENZEL, T. F. UNKLE

/66- /

INTERIOR-OFFICE OF SALINE WATER

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GUE 165 FIELD 7D,20M, 7B

THE MEASUREMENT OF EVAPORATION AND CONDENSATION COEFFICIENTS OF WATER UNDER EQUILIBRIUM CONDITIONS

R. W. COUGHLIN

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INTERIOR-OFFICE OF SALINE WATER

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GUE 166 FIELD 7D, 7A,14E,20M

BEHAVIOR OF LIQUID SURFACES DURING EVAPORATION AND CONDENSATION

K. C. HICKMAN, A. DAVIDHAZY, J. R. MAA O. MADY

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PCS 450 FIELD 7C, 7D

SYNTHESES AND PROPERTIES OF OXIRENE DERIVATIVES

R. C. KERBER

562-G1
9/65- 8/66

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PCS 452 FIELD 7D,20M

MOLECULAR SPECTROSCOPY AT VERY HIGH PRESSURES

M. F. NICOL

566-G2
9/65- 8/66

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PCS 453 FIELD 7C,20M

ENTROPY AND HEAT CAPACITY ANALYSES FOR SYSTEMS INVOLVING HINDERED ROTATION

C. A. WULFF

569-G2
9/65- 8/66

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PCS 455 FIELD 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

THE REACTION OF ALKALI METAL HYDROBORATES WITH ELEMENTAL SULFER

B. F. SPIELVOGEL

584-G2
9/65- 8/66

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PCS 456 FIELD 7D, 7B

THE DONOR PROPERTIES OF TELLURIUM TOWARD TRANSITIONAL METAL IONS

W. H. BADDLEY

588-G2
9/65- 8/66

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PCS 459 FIELD 20J, 7B

BOSTON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

BLENDING OF INDUCTIVE AND RESONANCE EFFECTS IN CARBON ACIDITY

J. P. LORAND

592-G1
9/65- 8/66

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PCS 460 FIELD 7D,20J

STUDY OF THE CONTRIBUTION OF INTERMOLECULAR DIPOLE-DIPOLE INTERACTIONS TO NUCLEAR MAGNETIC RELAXATION

K. F. KUHLMANN

594-G2
9/65- 8/66

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PCS 461 FIELD 7C, 7A

THE REACTIVITY OF METHYLENE

R. W. CARR

595-G2
9/65- 8/66

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PCS 463 FIELD 7C, 7B

STRUCTURAL INFLUENCES ON PRIMARY AND SECONDARY HYDROGEN ISOTOPE EFFECTS

J. R. KEEFFE

601-G1
9/65- 8/66

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PCS 468 FIELD 20M

THE ACTIVITY COEFFICIENT BEHAVIOR OF ORGANIC SOLUTES IN MIXED H2O/D2O ACIDIC MEDIA

M. A. MATESICH

616-G2
9/65- 8/66

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PCS 470 FIELD 7D

DESIGNING REACTORS TO ACT AS CHEMICAL OSCILLATORS

J. M. DOUGLAS

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PCS 476 FIELD 7C, 7D

CATHOLIC UNIV OF AMER, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, DIST OF COLUMBIA

SIMULTANEOUS COMPETITIVE AND NON-COMPETITIVE ADSORPTIONS IN CATALYTIC REACTIONS - OLEFIN HYDROGENATION

M. M. LIH

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9/65- 8/66

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PCS 483

EXPERIMENTAL AND THEORETICAL STUDIES IN MOLECULAR SPECTROSCOPY AND THE ELECTRONIC STRUCTURE OF MOLECULES

S. R. LAPAGLIA

673-G2
9/65- 8/66

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PCS 484 FIELD 7C, 7D

X-RAY STRUCTURE OF AN INHEERENTLY DISSYMMETRIC CHROMOPHORE

C. F. HAMMER

677-G2
9/65- 8/66

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PCS 485 FIELD 7A, 7D

THE EFFECT OF ADSORPTION ON ELECTRODE KINETICS

A. DELEVIE

678-G2
9/65- 8/66

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PCS 487 FIELD 7D, 7A

EXPERIMENTAL STUDY OF MOLECULAR MOTION IN LIQUIDS AND GASES USING N.M.R.

J. H. NOGGLE

684-G2
9/65- 8/66

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PCS 488 FIELD 20J

THEORETICAL MOLECULAR STRUCTURE INVESTIGATIONS

J. L. WHITTEN

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PCS 489 FIELD 7C, 7D, 7B

GEORGIA INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, GEORGIA

STUDIES UPON CARBANIONS

E. GROVENSTEIN, Y. M. CHENG, G. WENTWORTH

1/66-12/66

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PCS 492 FIELD 7C, 7D, 7B

ALLENE CHEMISTRY

J. K. CRANDALL

PRF-2599A1
2/66- 8/67

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PCS 494 FIELD 7C, 7D

INTL CHRISTIAN UNIV, JAPAN

PRODUCTION OF FREE RADICALS AT SUBZERO TEMPERATURES

H. MINATO

2/66- 8/67

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PCS 496 FIELD 7C,20J, 7B

UNIV OF NEW SO WALES, AUSTRALIA

STERIC INTERACTION WITH ELECTRON PAIRS

S. J. ANGYAL

2/66- 8/67

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PCS 499 FIELD 7C, 7D

UNIV OF MINNESOTA, GRADUATE SCHOOL, CHEMISTRY, MINNESOTA

REARRANGEMENTS OF SULFIDES, SULFOXIDES, AND SULFONES

R. M. DODSON

2/66- 8/67

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PCS 500 FIELD 20H,20J

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, CHEMISTRY, MARYLAND

A THERMODYNAMIC STUDY OF CONJUGATION ENERGY

S. W. STALEY, W. H. ELKINS, C. MANNING C. E. WHITE

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PCS 502 FIELD 7D,20J, 7B

UNIVERSITY OF GEORGIA, GRADUATE SCHOOL, CHEMISTRY, GEORGIA

STUDIES OF MIXED OCTAHEDRAL METAL CARBONYL COMPLEXES

G. R. DOBSON

2/66- 8/67

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PCS 504 FIELD 7C, 7D, 7A, 7B

SYRACUSE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

STUDIES IN COORDINATION CHEMISTRY

W. A. BAKER

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PRW 5 1 FIELD 7A,20J, 5A, 7B

GENERAL ELECTRIC CORP, PHILADELPHIA, PENNSYLVANIA

QUANTUM MECHANICAL CALCULATIONS OF ATOMIC STABILITY AND CONFIGURATION AND OF REACTION CROSS SECTIONS AND RATES

E. P. MUNTZ, F. O. MATSEN

F-015
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

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PRW 6 1 FIELD 20J,20C, 5A,20F

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, PHYSICS, TEXAS

X-RAY ABSORPTION EDGE STUDIES OF CHEMICAL BONDING

H. P. HANSON

F-016
5/65 -4/66

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PRW 8 1 FIELD 7C, 7A, 7D,20J

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

EFFECT OF STRUCTURE ON THE REACTIVITY AND PROPERTIES OF ORGANIC COMPOUNDS

C. K. HANCOCK

A-023
5/65- 4/66

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PRW 10 1 FIELD 7C, 7A, 7D

ST. LOUIS UNIVERSITY, SCHOOL OF ENGINEERING, GEOPHYS + GEOPHYS ENGR, MISSOURI

THE REARRANGEMENT OF HYDRAZOAROMATIC AND THIOAROMATIC COMPOUNDS

W. V. STAUDER, R. DHOLLANDER
R. E. SPILLETT

D-028
5/65- 4/66

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PRW 12 1 FIELD 7D,20H,20J, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

ELECTRICAL DOUBLE LAYER - PASSIVITY

N. HACKERMAN

F-032
11/64-10/65

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PRW 17 1 FIELD 7A,20J

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

NUCLEAR MAGNETIC RESONANCE INVESTIGATION OF PARAMAGNETIC SOLUTIONS

L. O. MORGAN

F-041
5/65- 4/66

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PRW 27 1 FIELD 7C, 7A,20J, 7B

BATTELLE MEMORIAL IN, OHIO

MAGNETIC AND ELECTRICAL PROPERTIES OF THE CHALKOGENIDES OF SOME TRANSITION METALS

W. H. JONES

N-056
5/65- 4/66

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PRW 31 1 FIELD 7C,20J,20L

IBM RESEARCH CENTER, NEW YORK

STRUCTURAL INVESTIGATIONS OF CERTAIN COMPLEX COMPOUNDS

D. J. TEANEY, H. S. CONNER
R. F. CUPELAND, W. G. MCPHERSON
B. K. ROBERTSON, W. W. SCHWEIKERT

A-066
5/65- 4/66

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PRW 32 1 FIELD 7C, 7D,20J, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

SOME NEW ASPECTS OF PI ELECTRON INTERACTIONS

R. PETTIT

F-067
5/65- 4/66

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PRW 33 1 FIELD 7C, 7D, 7A, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

RESEARCH ON FRIEDEL-CRAFTS AND RELATED REACTIONS OF ALKYL-ARYL COMPOUNDS

R. M. ROBERTS

F-068
5/65- 4/66

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PRW 34 1 FIELD 7C, 7D,20J, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

THE SYNTHESIS, CHARACTERIZATION, AND STRUCTURE OF COORDINATION COMPOUNDS

G. W. WAT

F-069
5/65- 4/66

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PRW 50 1 FIELD 7C, 7A,20H,20J

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

INFRARED SPECTROSCOPY NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY, MOLECULAR STRUCTURE, + THERMODYNAMIC PROPERTIES OF CHEMICAL COMPOUNDS

A. DANTI, L. L. ALTPETER, F. B. BROWN
D. F. KOSTER

A-088
5/65- 4/66

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PRW 51 1 FIELD 7C, 7A, 7D

LAMAR ST COLL OF TECH, UNDERGRADUATE SCHOOL, TEXAS

SENECIO ALKALOIDS - SYNTHESIS OF THE NECIC ACIDS

J. D. EDWARDS

V-089
5/65- 4/66

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PRW 54 1 FIELD 20J

RICE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

PROBLEMS IN CHEMICAL BONDING

K. S. PITZER

C-092
5/65- 4/66

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PRW 55 1 FIELD 7C, 7D,20J

TEXAS CHRISTIAN UNIV, GRADUATE SCHOOL, CHEMISTRY, TEXAS

SOME STUDIES OF ORGANIC REACTION MECHANISMS USING CARBON-14

W. B. SMITH, C. GONZALEZ, M. SHOWALTER

P-093
5/65- 4/66

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PRW 57 1 FIELD 7C, 7D,20M,20J

UNIV OF HOUSTON, GRADUATE SCHOOL, CHEMISTRY, TEXAS

THE ROLE OF ELECTRON AFFINITY IN CHARGE TRANSFER STABILIZATION OF HYDROGEN BONDING

W. E. WENTWORTH

E-095
5/65- 4/66

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PRW 60 1 FIELD 7C,12A,20J

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

MICROWAVE SPECTROSCOPY

J. E. BOGGS, O. RENDOV, E. HAUSCHILD

F-100
5/65- 4/66

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PRW 61 1 FIELD 7C, 7D

UNIV OF CAL-BERKELEY, SCHOOL OF AGRICULTURE, PLANT PATHOLOGY, CALIFORNIA

THE GABRIEL-COLMAN REARRANGEMENT

J. R. PARMETER

M-101
5/65- 4/66

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PRW 62 1 FIELD 7C, 7D,20J

PHOTOCHEMISTRY OF UNSATURATED HYDROCARBONS

W. L. JOHNSON

F-102
5/65- 4/66

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PRW 63 1 FIELD 7C, 7A, 7D,20J

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

CHEMICAL KINETICS STUDIES IN SHOCK WAVES

W. C. GARDINER

F-104
5/65- 4/66

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PRW 64 1 FIELD 7C, 7A, 7D,20J

NORTH TEXAS STATE UNIV, GRADUATE SCHOOL, TEXAS

PROPERTIES OF ORGANOMETALLIC COMPOUNDS

W. H. GLAZE

B-105
5/65- 4/66

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PRW 65 1 FIELD 7C,20M,12A,20J

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

SOLID STATE MOLECULAR SPECTROSCOPY

R. M. HEDGES

A-106
5/65- 4/66

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PRW 66 1 FIELD 7C, 7D,20J, 7B

SAM HOUSTON STATE, UNDERGRADUATE SCHOOL, TEXAS

INVESTIGATIONS ON THE CHEMISTRY OF SULFUR-SULFUR BOND

R. C. HUMPHREY

X-107
5/65- 4/66

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PRW 68 1 FIELD 7C, 7D,20M, 7B

RICE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

THERMODYNAMIC AND KINETIC FACTORS IN HIGH TEMPERATURE PROCESSES

J. L. MARGRAVE, C. O. BOWIN, E. T. BUNCE
J. P. HERSEY, A. J. NALWALK, J. REITZEL

C-109
5/65- 4/66

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PRW 69 1 FIELD 7C, 7D,20J

BAYLOR UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

ORGANIC MONTMORILLONITES

J. L. MCATEE, C. O. BOWIN, E. T. BUNCE
J. P. HERSEY, A. J. NALWALK, J. REITZEL

QAA-110
5/65- 4/66

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PRW 70 1 FIELD 7C, 7D,20J

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RESTRICTED ROTATION STUDIES

A. G. PINKUS

QAA-111
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PRW 72 1 FIELD 20M,20J,20L, 7B

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, PHYSICS, TEXAS

STUDIES ON CHEMICAL SYSTEMS

C. F. SQUIRE

A-113
5/65- 4/66

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PRW 73 1 FIELD 7C, 7A, 7D, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

THE ROLE OF SURFACE STRUCTURE IN HETEROGENEOUS CATALYSIS

W. H. WADE

F-114
5/65- 4/66

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PRW 74 1 FIELD 12A,20J, 7B

QUANTUM MECHANICAL INVESTIGATIONS OF THE CHEMICAL AND PHYSICAL PROPERTIES OF CERTAIN ATOMIC AND MOLECULAR SYSTEMS

C. H. WOMACK

J-115
5/65- 4/66

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PRW 75 1 FIELD 7C, 7A,20J,20C

USDA, RICHMOND, VIRGINIA

MOLECULAR STRUCTURE STUDIES BY MEANS OF GAS-PHASE ELECTRON DIFFRACTION

J. M. TENNET

F-116
5/65- 4/66

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PRW 77 1 FIELD 7C, 7D, 7B

SOUTHERN METHODIST, GRADUATE SCHOOL, TEXAS

SUBSTITUENT EFFECTS ON THE ORIENTATION AND REACTIVITY OF THE BENZYNE INTERMEDIATES

E. R. BIEHL

M-118
5/65- 4/66

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PRW 82 1 FIELD 7C, 7D

MCMURRY COLLEGE, UNDERGRADUATE SCHOOL, TEXAS

INTERACTION OF ACETYLENIC AMINES WITH

KETENE

R. W. SONNTAG

Z-123
5/65- 4/66

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PRW 84 1 FIELD 7D

HIGH RESOLUTION MASS SPECTROSCOPY AND GAS CHROMATOGRAPHY

E. C. HORNING

Q-125
5/65- 4/66

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PRW 89 1 FIELD 7D,20J, 7B

TEXAS WOMANS UNIV, GRADUATE SCHOOL, CHEMISTRY, TEXAS

MICROWAVE SPECTROSCOPY

L. C. SAMS

M-129
5/65- 4/66

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PRW 90 1 FIELD 7C

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, BOTANY, TEXAS

SESQUITERPENE LACTONES

T. J. MABRY

E-130
5/65- 4/66

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PRW 96 1 FIELD 7C, 7A, 7D

RICE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

CHEMICAL BEHAVIOR OF IONS IN GASES

J. L. FRANKLIN

C-134
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

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PX 340 FIELD 7C, 7D, 7A, 7B

STUDY OF THE CYCLODEHYDRATION RATES FOR VARIOUS SUBSTITUTED O-BENZYL-BENZOPHENONES

M. O. SPANGLER, J. C. WOLFORD

12/65-11/66

AMERICAN ASSOC FOR ADVAN OF SCIENCE

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UT 512 FIELD 7C, 7D,20M, 7B

THERMAL DECOMPOSITIONS OF HYPONITRITES

W. ADAM

9/65- 8/66

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UT 513 FIELD 7C, 7A, 7D,20M

DIELECTRIC RELAXATION IN MIXTURES OF POLAR LIQUIDS

R. L. AMEY

9/65- 8/66

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UT 514 FIELD 7C, 7D,21B, 7B

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G. L. BAKER

9/65- 8/66

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UT 519 FIELD 7D, 7B

WASHINGTON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MISSOURI

ELECTRONIC SPECTRA OF ALKALI HALIDE MOLECULES

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UT 521 FIELD 7C, 7D

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MECHANISMS OF REACTIONS OF ORGANOMETALLIC COMPOUNDS IN SOLUTION

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MODEL EXPERIMENTS USING NEUTRON ACTIVATION ANALYSIS TO DETECT OXYGEN-18 IN POSSIBLE ACTIVE SITES IN PEPTIDES AND AMINO ACIDS

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THE CRYSTAL AND MOLECULAR STRUCTURES OF METAL CARBONYL HALIDES AND CLOSELY RELATED COMPOUNDS

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A KINETIC AND MECHANISTIC EXAMINATION OF CHROMYL CHLORIDE OXIDATIONS

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A STUDY OF THE ISOMERIZATION OF ALPHA OLEFINS DURING THE RITTER REACTION

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DECARBOXYLATION OF TRICYCLO - 23.6 .1.0 - PYRAN-2-ONE

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THE EFFECT OF PRESSURE UPON THE RATE OF RACEMIZATION OF INORGANIC COMPOUNDS

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SYNTHESIS AND STUDY OF SOME UNUSUAL TYPES OF ORGANOTIN COMPOUNDS, - RSNY - , AND RSN - ,

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D HYPOFLUORITES AS SELECTIVE FLUORINATING AND OXIDIZING AGENTS

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PHOTOCHEMICAL SYNTHESIS OFTHE GROUP IV HYDRIDES AND THEIR DERIVATIVES

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CHEMICAL SYNTHESIS OF ISOTOPICALLY DOUBLE-LABELED DIDEOXYRIBONUCLEOTIDES

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ZQA 4 FIELD 7C, 7D,14E, 5A

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

INFLUENCE OF MOLECULAR ORIENTATION ON DYNAMIC FLUID FILM PROFILE

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USA, CHEM CORPS, EDGEWOOD ARSENAL, MARYLAND

RADIOCHEMICAL ANALYSIS

C. CRISCO, H. MORTKO

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ZQF 260199 FIELD 21B, 7A, 7D, 8K

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INFRARED CHEMILUMINESCENCE FROM GAS REACTIONS

A. T. STAIR

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DOD-AIR FORCE

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ZQF 260200 FIELD 7C, 7D, 9C,20L

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

QUANTUM PROCESSES

A. GOLUBOVIC

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ZQF 284892 1 FIELD 7D,20J,20F

USAF, AFSC, RTD, WRIGHT-PATT-AF MAT LAB, OHIO

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J. H. MUNTZ

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EXCITED STATE CONFORMATIONS

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ZQN 544138 FIELD 20M,15+, 9+, 9A

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

EFFECTS OF PRESSURE ON ELECTRODE POTENTIALS

J. B. CRILLY, W. S. HAYNES

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DOD-NAVY

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USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

OPTIMIZATION OF HEAT TRANSFER IN A MULTI-STAGE FLASH EVAPORATOR

E. J. BECK, E. H. WOLFF

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UTILIZATION OF WASTE HEAT FOR DISTILLING SEA WATER

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ZT 58 4 FIELD 7D, 7B

TENN VALLEY AUTHORITY, TENNESSEE

USE OF STRONG SULFURIC ACID IN PRODUCTION OF PHOSPHORIC ACID

M. R. SIEGEL

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TENNESSEE VALLEY AUTHORITY

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ZT 68 4 FIELD 7D, 7B

TENN VALLEY AUTHORITY, TENNESSEE

TECHNOLOGY OF WET-PROCESS PHOSPHORIC ACID

J. G. GETSINGER

C13P4
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TENNESSEE VALLEY AUTHORITY

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ZUG 790 FIELD 7D,20J, 5A, 7B

USDI, BUR MINES, ROLLA, MISSOURI

MOLECULAR COMPOSITION OF METAL HALIDE VAPORS

J. W. JENSEN, R. T. DEWOODY
A. E. SCHWANEKE, A. VISNAPUU

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INTERIOR-BUREAU OF MINES

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USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

METHANE MONITOR COMPONENT DEVELOPMENT

E. J. COGGESHALL, R. A. BRADBURN
M. JACOBSON, M. J. PAZUCHANICS
L. W. SCOTT, R. A. WOLF

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INTERIOR-BUREAU OF MINES

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ZUG 853 FIELD 7C,21D, 7D, 7A

USDI, BUR MINES, DIST OF COLUMBIA

SYNTHESIS OF HIGH-BTU GAS IN A TUBE-WALL REACTOR ENGINEERING DEVELOPMENT

J. H. FIELD, A. J. FORNEY, S. J. GASIOR

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INTERIOR-BUREAU OF MINES

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ZUG 884 FIELD 7C, 7D, 7B

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

SURFACE CHEMISTRY RESEARCH

P. B. LORENZ, E. C. DONALDSON
R. D. THOMAS

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ZVA 134 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

DETERMINATION OF SUBSIDIARY COLORS AND THE INTERMEDIATE PYRENE TRISULFONIC ACID IN D+C GREEN NO. 8

A. B. LEATHERMAN, K. A. FREEMAN

FDA-V-012-02
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HEW-FOOD + DRUG ADMINISTRATION

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ZVA 151 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

DETERMINATION OF SUBSIDIARY DYES IN D+C RED NO. 36

C. GRAICHEN, P. BULHACK, K. A. FREEMAN

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HEW-FOOD + DRUG ADMINISTRATION

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ZYA 21138 FIELD 7C, 7D,20M,20J

USDA, WYNDMOOR, PENNSYLVANIA

STRUCTURE OF ANIMAL FAT CONSTITUENTS + DERIVATIVES

H. SUSI

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AGRICULTURE-DEPT OF AGRICULTURE

08 EARTH SCIENCES AND OCEANOGRAPHY

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UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, GEOLOGY + MINERALOGY, MICHIGAN

EVALUATION OF GEOPHYSICS RESEARCH PROGRAM

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UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, GEOLOGY, TEXAS

INVESTIGATION OF THE BURIED CRUST OF THE NORTH AMERICAN CONTINENT

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UNIVERSITY OF NEVADA, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, NEVADA

STUDY OF THE SEISMICITY FAULTING + CRUSTAL STRUCTURE WITHIN THE NEVADA BASIN + RANGE PROVINCES

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ST. LOUIS UNIVERSITY, SCHOOL OF ENGINEERING, GEOPHYS + GEOPHYS ENGR, MISSOURI

S WAVE PROJECT FOR FOCAL MECHANISM STUDIES

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STUDY OF SEISMIC PHENOMENA CONNECTED WITH EARTHQUAKES AND EXPLOSIONS

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UNIV OF CAL-L. A., GRADUATE SCHOOL, GEOPHYS + PLANET PHYS, CALIFORNIA

NATURE OF SURFACE WAVE PROPAGATION IN CRYSTAL STRUCTURE OF VARYINGTHICKNESS

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COLLECTION AND ANALYSES OF SEISMIC WAVE PROPAGATION DATA

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THE CENTRAL CALIFORNIAN LARGE-SCALE SEISMIC ARRAY

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COLUMBIA UNIVERSITY, GRADUATE SCHOOL, NEW YORK

USE OF OPTICAL MASERS AS TRANSDUCERS FOR PENDULUM AND STRAIN SEIS-MOGRAPHS

L. E. ALSOP

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09 ELECTRONICS AND ELECTRICAL ENGINEERING

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GH 1258 1 FIELD 9+

UNIV OF ROCHESTER, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

A STUDY OF NON-LINEAR CONTROL SYSTEMS PROBLEMS

E. KINNEN

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GPF 121 3 FIELD 9+,12A, 9D

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, INST FOR COMPUTER RES, ILLINOIS

COMPUTER RESEARCH AND DEVELOPMENT

N. C. METROPOLIS, R. L. ASHENHURST
R. L. GRAVES, H. KANNER, R. H. MILLER
A. ORDEN, W. V. PETRYSHYN

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GGA 202 1 FIELD 12A,15C,15G

DEVELOPMENT OF COMPUTER PROGRAMS TO ASSIST IN PRODUCTIONS REVISION CHANGE PROCESSING OF TOES SECTIONS 2 + 3

D. WALLACE, C. ROWE

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USACDCCSSR AUTOMATIC DATA PROCESSING SYSTEM SPECIFICATIONS STUDY

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DIGITAL MACHINES AND AUTOMATA

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NETWORK SYNTHESIS

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UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, MICHIGAN

STUDY OF TRANSFORM TECHNIQUES FOR TIME-VARYING DISCRETE-TIME LINEAR SYSTEMS

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RESEARCH ON MECHANICAL LANGUAGES AND THEIR AUTOMATIC TRANSLATORS

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ACTIVE TIME-VARYING SYSTEMS AND LINEAR NETWORKS

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AUTOMATA THEORY AND FOUNDATIONS OF DICISION THEORY

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FUNCTIONAL NETWORK ANALYSIS AND SYNTHESIS

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PERFORMANCE DESIGN AND ORGANIZATION OF HYBRID COMPUTER SYSTEMS

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APPLICATION OF GRAPH THEORY TO NETWORKS

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AUTOMATIC THEORY FORMATION AND RELATIVE COMPLEXITY OF PROGRAMS

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ADAPTIVE PREDICTIVE CONTROL SYSTEMS

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CONTROL SYSTEMS RESEARCH PROGRAM

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THEORY OF METHODS FOR IMPLEMENTING INDUCTIVE INFERENCE

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UNIV OF ROCHESTER, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

SELF-ADAPTING AUTOMATA UNIVERSAL ELEMENTS AND A SPECIAL PURPOSE COMPUTER

J. F. RANDOLPH

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GQF 3821 FIELD 18,17G, 9•,12A

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RESEARCH IN CONTROL SYSTEMS THEORY

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STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUT • ASTRONAUT, CALIFORNIA

DETERMINATION OF OPTIMAL CONTROLS FOR SYSTEMS WITH DELAYS

I. FLUGGELOTZ

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THE STRUCTURE OF NETWORKS AUTOMATA AND CONTROL SYSTEMS

R. E. KALMAN

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INFORMATION PROCESSING BY EVOLUTIONARY AND MULTILEVEL NETWORKS

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APPLICATIONS OF CLASS K FUNCTIONS TO PASSIVE AND ACTIVE NETWORK SYNTHESIS

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ANALYSIS OF ADAPTIVE LOGIC OPTIMIZATION

S. AUSLENDER

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10 ENERGY CONVERSION (NON-PROPULSIVE)

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UNIV OF ROCHESTER, SCHOOL OF ENGINEERING, AEROSPACE + MECH SCI, NEW YORK

CONVERSION OF HEAT INTO ALTERNATING CURRENT

H. S. DUNN

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11 MATERIALS

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GPF 16 2 FIELD 11F,11G,20L, 7B

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, METALLURGY, MASSACHUSETTS

FUNDAMENTALS OF DIFFUSION

R. E. OGILVIE, D. KOFFMAN, N. KOOPMAN T. ZIEBOLD

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GPF 867 1 FIELD 7C, 7A,20M,11F

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, MICHIGAN

TRANSPORT PROPERTIES IN LIQUID METALS

E. E. HUCKE

AT(11-1)1352
12/65-11/66

AEC-DIVISION OF PHYSICAL RES

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GPF 882 1 FIELD 7D,11F,11G,12A

UNIVERSITY OF OKLAHOMA, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, OKLAHOMA

DIFFUSION IN BINARY LIQUID METAL SYSTEMS

F. B. CANFIELD

AT(40-1)-3396
5/66- 4/67

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GPF 894 1 FIELD 11C,11F,11G,20L

UNIVERSITY OF OKLAHOMA, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, OKLAHOMA

THE EFFECTS OF SURFACE COATINGS ON THE PLASTIC DEFORMATION OF METAL SINGLE CRYSTALS

R. J. BLOCK

AT(40-1)-3401
5/66- 5/67

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GQA 345 FIELD 11F,11G

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MIN METAL + PETROL ENG, ILLINOIS

MARTENSITIC TRANSFORMATIONS IN THE BINARY IRON ALLOYS IRON-IR IRON-OSMIUM IRON-PT AND IRON-RU

C. M. WAYMAN

DA-31-124-ARO-D-281
/65- /

DOD-ARMY

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GQA 425 1 FIELD 7C, 7D, 7B

USDC, NATL BUR STAN, DIST OF COLUMBIA

POLYMER ADSORPTION

R. R. STROMBERG

/65- /

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GQA 468 FIELD 11F,11G

MARTIN CO BALTIMORE, MARYLAND

THE MECHANISM OF STRESS-CORRDSION CRACKING

E. N. PUGH

DA-31-124-ARO-D-258
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GQA 550 FIELD 11B, 5A,11F,11G

MARTIN CO BALTIMORE, MARYLAND

CONFERENCE ON ENVIRONMENT SENSITIVE MECHANICAL BEHAVIOR OF MATERIALS

A. R. WESTWOOD

/65- /

DOD-ARMY

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GQF 1053 7 FIELD 20M,11B,20L, 7B

NORTHWESTERN UNIV, SCHOOL OF ENGINEERING, MATERIALS SCIENCE, ILLINOIS

TRANSPORT PHENOMENA AND DEFECT STRUCTURE STUDIES IN NONSTOICHIOMETRIC CERAMICS

D. M. WHITMORE, D. •. WHITMORE

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GQF 1344 4 FIELD 11C,11F,11G

MARTIN CO BALTIMORE, MARYLAND

EFFECT OF VACUUM ENVIRONMENT ON MECHANICAL BEHAVIOR OF MATERIALS

I. R. KRAMER

AF-49-638-01455
/65- /

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GQF 3523 2 FIELD 11F,11G,20L

UNIV OF BIRMINGHAM, UNITED KINGDOM

STABILITY OF THE BODY CENTERED CUBIC STRUCTURE IN METALS AND ALLOYS

R. W. SMITH

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GQF 4342 FIELD 11F,11G,20L

WASHINGTON STATE UNIV, SCHOOL OF ENGINEERING, METALLURGY, WASHINGTON

FACTORS AFFECTING THE INITIAL PLASTIC BEHAVIOR OF CLOSE PACKED METAL SINGLE CRYSTALS

R. F. TINDER

AF-AFOSR-0833-65
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GQF 4516 FIELD 11F,11G

MELLON INST OF INDUS, PENNSYLVANIA

STACKING FAULTS IN FACE-CENTERED CUBIC ALLOY PHASES

L. F. VASSAMILLET

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GQF 207381 2 FIELD 20M,20D,20L, 7B

SYS. RES. LAB. INC.,, OHIO

ELECTRICAL BEHAVIOR OF REFRACTORY MATERIALS

R. W. VEST

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GQF 207508 FIELD 11F,11G

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

WORK HARDENING BEHAVIOR IN FCC METALS

J. ROBERTSON

/65- /

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GQF 207511 FIELD 7D, 7C,20M,11F

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

PHASE EQUILIBRIA STUDIES - THE BORON-SILICON AND IRON-NICKEL- OXYGEN SYSTEM

L. BIDWELL

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GQF 207514 FIELD 7D, 7A,20M,11B

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

DIFFUSION MECHANISMS IN NON-METALLIC MATERIALS

K. RICHARDS

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GQF 207515 FIELD 11B,11D

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

RESEARCH ON CERAMIC AND METAL-CERAMIC SYSTEMS

R. KUH

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PHASE EQUILIBRIA RESEARCH

T. ROCKETT

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GQF 258374 2 FIELD 11B,11G,11C,11F

MANLABS INC CAMBRIDGE, MASSACHUSETTS

EXPER DETERMINATION OF CRYSTALLINITY + RELATED PARAMETERS OF THIN FILMS OF SUCH MATS AS BORON SIC

S. A. KULIN

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GQF 259878 FIELD 11G,10B,20L

NEW YORK UNIVERSITY, GRADUATE SCHOOL, NEW YORK

INVEST INORGANIC ORGANIC + MIXED MATS FOR UTILIZATION AS GASKETING MATERIALS AT ULTRA-HIGH PRESSURES

M. PRINCE

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GENERAL ELECTRIC CORP, PHILADELPHIA, PENNSYLVANIA

CATALYTIC THERMAL OXIDATIVE DEGRADATION OF ORGANIC POLYMERS AT ELEVATED TEMPERATURES

C. A. GAULIN

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MELLON INST OF INDUS, PENNSYLVANIA

MECHANICAL BEHAVIOR AND PHYSICAL CHEMISTRY OF POLYMERS

T. G. FOX

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RELATIONSHIPS BETWEEN POLYMERS AND THEIR GLASS-TRANSITION TEMPERATURES

O. G. LEWIS

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GQF 284676 3 FIELD 20M,11G,11H,12A

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HEAT AND MASS TRANSFER EFFECTS IN SLIDING METAL SYSTEMS LUBRICATED BY SOLID INTERFACIAL FILMS

F. F. LING

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GQF 284679 1 FIELD 7C,11B,11G,11H

SOUTHWEST RES INST, TEXAS

MECHANISMS OF FRICTION AND WEAR IN HIGH VACUUM

R. A. BURTON

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THE EFFECT OF SHEAR RATES ON VISCOSITY OF POLYMER SOLUTIONS

S. CLAESSON

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UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, ENGINEERING MECHANICS, MICHIGAN

PLASTICITY AND BRITTLE BEHAVIOR OF DUCTILE BCC METALS

R. M. HAYTHORNTHWAITE

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GQF 284716 4 FIELD 11G,11D,11F,13H

MASS. INDIV. GRANT, MASSACHUSETTS

ELECTRON MICROSCOPE STUDIES OF FILAMENTARY MONOCRYSTALS AND FINE WIRES OF METALLIC SUBSTANCES

A. REVERE

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GQF 284964 FIELD 11B,11C,11D, 7B

GENERAL TECHNOLOGIES, CORP, ALEXANDRIA, VIRGINIA

SYNTHESIS BY VAPOR DEPOSITION OF NEW FILAMENT MATERIALS

J. C. WITHERS

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GQF 284966 FIELD 20M,11B,13H,20L

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RUBIES FOR REFERENCE TEMPERATURE STANDARDS

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MASS INST OF TECHNOL, GRADUATE SCHOOL, MASSACHUSETTS

ROTOR BLADE AIRLOAD STUDIES

NONE

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GQN 544109 1 FIELD 9*, 9A,11D,11G

HI-STRENGTH INSULATORS

J. O. SWEENEY

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12 MATHEMATICAL SCIENCES

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GH 1217 1 FIELD 12A, 9D

KENT STATE UNIVERSITY, GRADUATE SCHOOL, OHIO

DEVELOPMENT AND ANALYZING BASIC SCIENTIFIC RESEARCH ENTITLED - STOCHASTIC MODELS FOR MULTIDIMENSIONAL MULTI-VALUED RELATIONS

T. N. BHARGAVA

NASA-P-2-NSG-568
12/64-11/65

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GQA 368 1 FIELD 12A

USDC, NATL BUR STAN, DIST OF COLUMBIA

ASYMPTOTIC SOLUTIONS OF ORDINARY LINEAR DIFFERENTIAL EQUATIONS

F. W. OLVER

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GQA 436 FIELD 12A

UNIV OF WISCONSIN, GRADUATE SCHOOL, MATHEMATICS, WISCONSIN

NON-LINEAR VOLTERRA AND DELAY EQUATIONS

J. J. LEVIN, J. A. NOHEL

DA-31-124-ARO-D-266
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DOD-ARMY

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GQF 219 8 FIELD 12A,13H

TECH HIGH SCH MUNICH, GERMANY

NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS

H. J. STETTER

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CLASSICAL ANALYSIS

L. V. AHLFORS

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GQF 2312 4 FIELD 12A

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

APPLICATIONS OF LAPLACE OPERATORS

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GQF 2673 3 FIELD 12A,13H,20D

STANFORD UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

DIFFERENTIAL EQUATIONS AND BOUNDARY VALUE PROBLEMS

G. E. LATTA

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GQF 3245 3 FIELD 12A

YESHIVA UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

SYMBOLIC LOGIC AND RECURSIVE FUNCTION THEORY

R. M. SMULLYAN

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GRUMMAN AIRCRAFT ENG, ISLAND, N. Y., NEW YORK

OPTIMIZATION THEORY AND AEROSPACE APPLICATIONS

R. E. KOPP

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GQF 3729 1 FIELD 9*,12A

WASHINGTON UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, MISSOURI

APPLICATION OF FUNCTIONAL POWER SERIES TO NONLINEAR SYSTEMS

J. ZABORSKY

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GQF 3755 1 FIELD 12A

SOCIETY FOR INDUSTRIAL, + APPLIED MATH, PHILA, PENNSYLVANIA

SIAM JOURNAL ON CONTROL

I. E. BLOCK

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GQF 3858 FIELD 12A

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, MATHEMATICS, ILLINOIS

DIFFERENTIAL TOPOLOGY

R. K. LASHOF

AF-AFOSR-0711-65
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13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

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GQF 258191 2 FIELD 22D,13B,13F

PRINCETON UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW JERSEY

RESEARCH ON DEFORMATION OF MACROPARTICLE SOIL SYSTEMS UNDER STATIC AND TRANSIENT LOADINGS

H. F. WINTERKORN

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GQF 258192 2 FIELD 13B,13F,12A,13M

PRINCETON UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW JEASEY

STUDY DEFORMATION BEHAVIOR OF NATURAL SOIL SURFACES + SUBSTRATA UNDER DYNAMIC WHEEL LOADS

W. E. SCHMID

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GQF 259034 1 FIELD 9+,20F

GENERAL ELECTRIC CO, SYRACUSE, NEW YORK

DESIGN BUILD + STUDY PROPS OF AN OPTICAL MATRIX PROCESSOR BASED ON USE OF THERMOPLASTIC FILM TECHNIQUE

G. J. CHAFARIS

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GQN 530492 FIELD 1C,13J

HYDRO-SKI TEST VEHICLE REPAIR

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GSE 468 2 FIELD 11G,12A,13M,20L

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, CALIFORNIA

DYNAMIC PLATE PERFORATION STUDIES

W. GOLDSMITH

NSF-GK-688
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

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GT 33 1 FIELD 13G,20D

UNIVERSITY OF IOWA, SCHOOL OF ENGINEERING, MECHANICS + HYDRAULICS, IOWA

STUDIES OF HYDRAULIC FORCES ON HIGH HEAD GATES

. NONE

24335A
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TENNESSEE VALLEY AUTHORITY

14 METHODS AND EQUIPMENT

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GQF 4332 FIELD 9+, 9A, 5A,18A

STANFORD UNIVERSITY, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

X-RAY DETECTION WITH SCINTILLATORS AND SEMICONDUCTORS
R. HOFSTADTER

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/65- /

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GQF 258054 FIELD 8N, 8G, 4A

USDC, CST + GEOD SURV, DIST OF COLUMBIA

CONSTRUCTION OF INSTRUMENT SHELTER FOR RECORDING MAGNETOMETER

R. W. KUBERRY

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GQF 420549 FIELD 20M, 6B, 9C, 9+

RADIATION SENSING TECHNIQUES

R. E. HENDRIX

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15 MILITARY SCIENCES

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GQA 198 FIELD 15G

THEATER POL REQUIREMENTS

J. KEMPER, R. GREEN

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DOD-ARMY

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GQA 201 2 FIELD 12A, 5C,15C,15G

COMPUTER-ASSISTED SIMULATION OF SUPPLY + RELATED SYSTEMS CASSARS

D. WALLACE, D. SAUNDERS

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GQA 205 FIELD 15G

SHELTER REQUIREMENTS FOR THE ARMY IN THE FIELD - 1966-1980

J. KEMPER, W. BASS

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17 NAVIGATION, COMMUNICATIONS DETECTION AND COUNTERMEASURES

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GH 1483 4 FIELD 9+

US, SMITHSONIAN INST, DIST OF COLUMBIA

OPTICAL SATELLITE TRACKING PROGRAM

F. L. WHIPPLE

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GQA 295 1 FIELD 9+,12A

COGNITIVE INFORMATION PROCESSING - PCM PICTURE TRANSMISSION SYSTEM ANALYSES

S. J. MASON, T. S. HUANG, S. +. MASON

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GQA 296 1 FIELD 9+,12A

COGNITIVE INFORMATION PROCESSING - B ANDWIDTH COMPRESSION IN PICTURE TRANSMISSION

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GQA 307 1 FIELD 9+,12A

COGNITIVE INFORMATION PROCESSING + S UBJECTIVE EFFECTS OF PICTORIAL NOISE

S. J. MASON, T. HUANG, S. +. MASON
C. J. TRETIAK

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GQF 2987 4 FIELD 8G, 8K, 8+, 9+

RCA RES LAB, PRINCETON, NEW JERSEY

AN ANALYSIS OF FACTORS LIMITING SEISMIC DETECTOR SENSITIVITY

D. S. MCCOY

AF-49-638-01456
/65- /

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18 NUCLEAR SCIENCE AND TECHNOLOGY

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GPE 963 3 FIELD 18A, 7B

STANFORD UNIVERSITY, SCHOOL OF MEDICINE, RADIOLOGY, CALIFORNIA

ENERGY DISSIPATION BY BETA-PARTICLE SOURCES

R. LOEVINGER, J. GEISSELSODER

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10/64- 9/65

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USN, BUR SHIPS, SAN FRANCISCO, CALIFORNIA

RADIATION SHIELDING EFFECTIVENESS OF COMPARTMENTED STRUCTURES

B. W. SHUMWAY

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UPDATING OF SM 1 SAFEGUARDS REPORT

M. P. ARRONSMITH

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GOF 363 12 FIELD 18A, 7D, 7B

MCMASTER UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CANADA

NUCLEAR STABILITY AND NUCLEAR ENERGETICS BY MEANS OF ATOMIC MASS MEASUREMENT

H. E. DUCKWORTH

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MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, MASSACHUSETTS

RSCH IN REACTOR SPECTROMETRY DOSIMETRY + NEUTRON ACTIVATION ANALYSIS

T. J. THOMPSON

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/65- /

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19 ORDNANCE

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GOA 191 1 FIELD 15C,19+,15D

GENERAL ELECTRIC CO, BURLINGTON, VERMONT

DESIGN DEVELOP TEST AND EVALUATE FORWARD AIR DEFENSE GUN SYSTEM

G. SCHIAVONE

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/65- /

DOD-ARMY

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GOF 420561 FIELD 6B, 9+,11G,20L

SOUTHERN RESEARCH INST, BIRMINGHAM, ALABAMA

RESEARCH STUDY TO DEVELOP HYPERVELOCITY IMPACT DATA RECORDER

J. R. COOPER, J. E. HORN

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20 PHYSICS

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GH 22 2 FIELD 20H

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, PHYSICS, ILLINOIS

THEORETICAL RESEARCH ON THE PERIODIC MOTION AND STABILITY OF A SMALL MASS UNDER THE GRAVITATIONAL ATTRACTION OF TOW HEAVY BODIES

J. H. BARTLETT, C. WAGNER

NSG-280
6/64- 7/65

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GH 37 3 FIELD 11G,20K

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, CALIFORNIA

THE EFFECT OF NON-LINEAR MATERIAL PROPERTIES ON THE STRESS DISTRIBUTION IN THIS SPHERICAL SHELLS

E. P. POPOV

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6/65- 5/66

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GH 107 2 FIELD 20H,11G,12A,13H

THEORETICAL AND EXPERIMENTAL STUDY OF THERMAL CONTACT RESISTANCE IN A VACUUM ENVIRONMENT

A. M. CLAUSING, L. S. CHEEMA
R. D. MCNARY

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GH 495 2 FIELD 5A,20L

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL PHYSICS, ILLINOIS

THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF SUPER-CONDUCTIVITY

M. H. COHEN

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JOHNS HOPKINS UNIV, GRADUATE SCHOOL, PHYSICS, MARYLAND

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF THE FUNDAMENTAL PROPERTIES OF RARE EARTH CRYSTALS

G. H. DIEKE

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GH 779 1 FIELD 12A,13M,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

STUDY OF LINE INTEGRALS, SURFACE INTEGRALS, VOLUMES, CENTROIDS, AND MOMENTS OF INERTIA FOR A CLASS OF SHELLS

W. J. WORLEY

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6/64- 5/65

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GH 810 2 FIELD 22C,22+,20M, 9+

UNIV OF ALABAMA, SCHOOL OF ENGINEERING, AEROSPACE ENGINEERING, ALABAMA

RESEARCH IN THE AEROSPACE PHYSICAL SCIENCES

R. HERMANN, G. R. CHOUDARY, H. CHU
J. C. DOWDLE, R. DUERR, W. R. GARRETT
M. A. GERAGHTY

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3/65- 2/66

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UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

INVESTIGATION OF THE FLOW AND HEAT TRANSFER CONDITIONS WITHIN SEPARATED FLOW REGIONS

H. H. KORST, A. L. ADDY, E. L. BALES
W. L. CHOW, R. H. HOWELL, R. A. WHITE
P. S. YEH

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GH 1022 3 FIELD 14A,20D

USDC, NATL BUR STAN, DIST OF COLUMBIA

CONDUCT INVESTIGATION OF THE MECHANISM OF TRANSITION FROM LAMINAR TO TURBULENT FLOW IN BOUNDARY LAYERS IN BOTH SUBSONIC AND SUPERSON

G. B. SCHUBAUER, P. S. KLEBANOFF
N. E. MEASE, H. L. PERRY, W. R. ROWLAND
L. M. SARGENT, W. SPANGENBERG

R-51
10/64- 9/65

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GH 1181 1 FIELD 20M,20C, 5A

UNIVERSITY OF KANSAS, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, KANSAS

STUDIES IN ELECTROCALORIC EFFECTS IN FERROELECTRIC SUBSTANCES

B. B. WISEMAN

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NASA

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RENSSELAER POLYTC INST, NEW YORK

SPATIAL NUCLEATION AND CRYSTAL GROWTH

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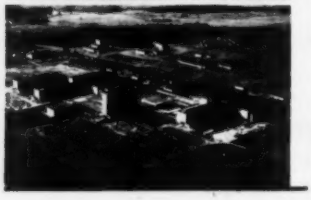

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